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ARDENING WITH WILDFLOWERS NATIVE PLANTS

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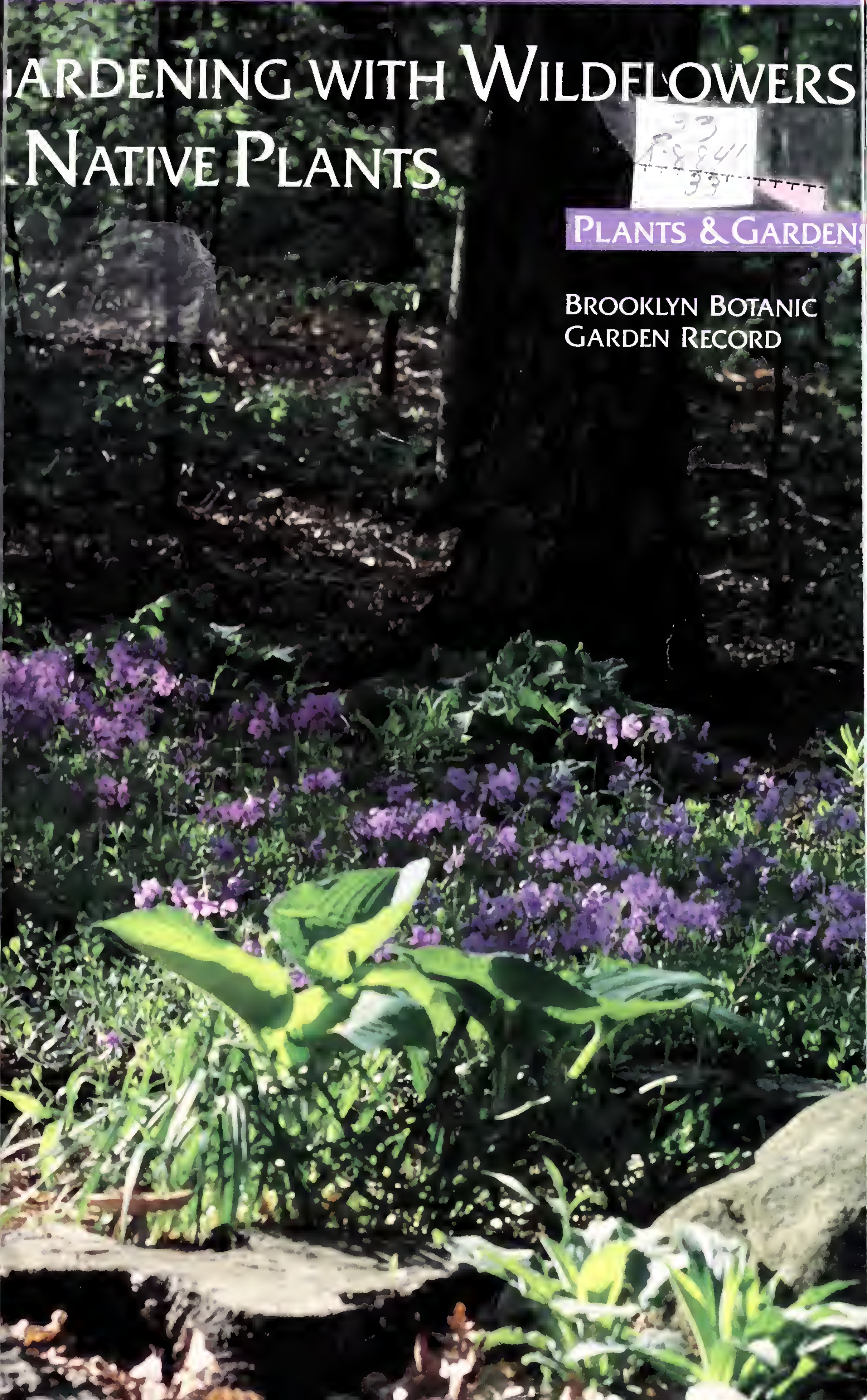
GARDEN RECORD



PLANTS & GARDENS

BROOKLYN BOTANIC GARDEN RECORD

Gardening with Wildflowers & Native Plants

1989

Brooklyn Botanic Garden

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PLANTS & GARDENS
BROOKLYN BOTANIC GARDEN RECORD

Gardening With Wildflowers & Native Plants

Vol. 45 Handbook #119 Spring 1989 No. 1

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Phlox stolonifera *Cover photograph by Judy Glattstein*

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Note from the Guest Editor

There are a few things you should know before you start reading the wealth of information about American native plants found between these covers. First, the basic reference used for scientific names is *A Synonymized Checklist of the Vascular Flora of the United States, Canada and Greenland.* Produced by John and Rosemarie Kartesz, it was published in 1980 by the University of North Carolina Press. Dr. Ritchie Bell, who has contributed to this handbook, assisted with the checklist. It is the most recent and comprehensive accounting of North American plant species.

Second, some of the plant combinations offered in the articles here include exotic plants. Throughout the handbook, an exotic is defined as any plant not native to the U.S., and is identified by an asterisk (*) following its name.

Third, the hardiness zones referred to throughout the handbook are those of the USDA Plant Hardiness Zone Map, as shown on page 99.

One other thing I'd like to add: In 1851, Andrew Jackson Downing wrote:

> *Nothing strikes foreign horticulturists and amateurs so much as this apathy and indifference of Americans to the beautiful sylvan and floral products of their own country. An enthusiastic collector in Belgium first made us keenly sensible of this condition of our countrymen, last summer, in describing the difficulty he had in procuring from any of his correspondents here, American seeds or plants, even of well known and tolerably abundant species, by telling us that amateurs and nurserymen who annually import from him every new and rare exotic that the richest collections of Europe possessed, could scarcely be prevailed upon to make a search for native American plants, far more beautiful, which grow in the woods not ten miles from their own doors. Some of them were wholly ignorant of such plants, except so far as a familiarity with their names in the books may be called an acquaintance. Others knew them, but considered them 'wild plants,' and therefore, too little deserving of attention to be worth the trouble of collecting, even for curious foreigners. 'And so,' he continued, 'in a country of azaleas, kalmias, rhododendrons, cypripediums, magnolias and nyssas—the loveliest flowers, shrubs, and trees of temperate climates—you never put them in your gardens, but send over the water every year for thousands of dollars worth of English larches and Dutch hyacinths. Voilà le goût Republicain!'**

Sadly, while Downing was tremendously influential regarding garden design, this quote could have been written yesterday (except perhaps for the dated writing style). It is my hope that the contributors who wrote passionately for this handbook will inspire you to plant some of "the loveliest flowers, shrubs and trees of temperate climates" in your garden.

Claire Sawyers
Guest Editor

**Quoted from* Rural Essays *first written for the* Horticulturist *and later collected by George William Curtis and published in book form in 1851.*

A naturalistic garden setting is planted with many rhododendrons, ferns, Leucothoe *and a number of different evergreen species.*

Claire Sawyers *is administrative assistant acting curator at Mt. Cuba Center in Greenville, DE, where she has learned much about native plants. She is a free-lance garden writer and a regional director of the Garden Writers of America Association (1989–1991). She holds masters degrees in plant science from Purdue University and the University of Delaware. She was guest editor of* Plants & Gardens *handbooks* Japanese Gardens *(1985) and* American Gardens: A Traveler's Guide *(1986).*

Fothergilla *species bloom in midspring displaying upright clusters of creamy white flowers. The shrubs have beautifully colored leaves in autumn.*

Why Native Plants?

The following address was made at the 1986 Longwood Graduate Program Seminar.

Harrison L. Flint

Before considering why we should *use* native plants in landscaping, we need to consider the more important question: Why should we *preserve* native plants?

Reasons for preserving native plants fall into two general categories:

- *Ecological reasons* have to do with how plants function in ecosystems. Extinction, the ultimate catastrophe for a species, is a one-way passage. Species are products of thousands or even millions of years of evolution. Once they are lost, replacement is so slow that, in the human time scale, it does not happen. There are other catastrophes as well. Ecosystems depend not just on the survival of a few remaining individuals, but on adequate numbers for interaction within the ecosystem. Rarely if ever do we know what population level is necessary, but our knowledge of ecosystems tells us there must be a level for each species. Moreover, survival of a species, especially in capricious climates, depends on maintaining a broad level of variation in the gene pool. So the population of a rare species is more important not just for the functioning of the ecosystem, but for the survival of the species itself.
- *Human reasons. Homo sapiens,* the species we belong to, is a strange member of our ecosystem, although we may not acknowledge or even recognize the fact. Our dependence on plant species for food, shelter and medicine is well known. We are also gripped by a psychic dependence on plants which make our surroundings familiar to us. In doing so, they give us a sense of protection, comfort, peace, and even inspiration. In the richness of their diversity they contribute to our human delight.

There are many different ways to use native plants. The most complex way is to reconstruct a plant community, or a significant part of one. The least complex is merely an "affirmative action" program to include more of the best native plants in nursery lists and in the palettes of landscape designers.

Efforts to promote the use of native plants have been going on for a long time in the Midwest, with the activities of pioneers like O. C. Simonds, who is often thought of as the father of the movement, and Jens Jensen, no purist in the use of native plants, yet a tremendous influence through his sensitive creation of landscapes that emulate nature. Another pioneer was the great communicator, May Theilgaard Watts. Her lifetime of teaching and writing about nature and natural landscapes at the Morton Arboretum, well sampled in her

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Harrison L. Flint *has taught at Purdue University in the area of woody landscape plants since 1968. At Purdue, he initiated the Professional Plantsman Program for students pursuing careers in botanical gardens and related institutions. Professor Flint has authored many popular and scientific articles and two books.* Landscape Plants for Eastern North America *has received two national awards. His* The Country Journal Book of Hardy Trees and Shrubs *describes landscape plants for cold climates.*

book, *Reading The Landscape*, educated several generations and set the stage for Ray Schulenberg's work in prairie restoration at the same institution.

Restoring Native Plant Communities

The complexity of most ecosystems, with their full range of plants, animals and microflora, makes full restoration practically impossible. The most ambitious efforts to date have included partly reconstructed communities of plants and animals. More often, restoration of native landscapes has been limited to most or part of the higher plant complement—overstory and understory trees, shrubs, and ground covers. Interest in this approach is increasing, and a growing number of landscape architects in this country and others are now devoting much of their time to constructing landscapes with native communities.

According to practitioners, reconstructed native plant communities offer specific advantages:

- *Regional uniqueness.* Native plant communities preserve in a region a *genius loci*, or pervading spirit that makes each place unique, identifiable, familiar and comfortable to its residents. When finished, a constructed landscape that emulates nature may once again express those qualities which first attracted us to the natural landscape.
- *Integrity.* With nature as inspiration, native plant communities give a feeling of wholeness and inherent compatibility. Such landscapes are in tune with seasonal changes of land and climate, and express this visually by their own seasonal changes. They serve as extensions of the greater landscape.
- *Educational and recreational value.* Living within a native plant community offers endless opportunities for observation of nature, with its attendant educational and recreational benefits. Our psychic roots draw us to nature, even when we resist. We sense that interaction with plant life can greatly ameliorate stress.

Using Native Plants in Mixed Landscapes

Native plant communities are useful in many types of landscapes, including urban sites. Yet in some situations their use is difficult or even impossible. Even when native *communities* cannot be reintroduced, native *species* are still useful. Their best use in such situations may be in artificial but visually compatible groupings, combined with non-native species that are fitted to the site because of adaptation to similar conditions in other parts of the world where they have evolved.

Photo by Claire E. Sawyers

Close-up view of the flowers of Fothergilla major. *The flower clusters are upright in a bottlebrush shape. They appear as the leaves are unfolding.*

In mixed (native and non-native) landscapes, we attempt to imitate or even step beyond nature's exemplary combining of plant species. In selecting plant combinations, we set out to achieve in a mortal life span what has taken nature thousands of years to accomplish. If we recognize that we are doing this, we may assume an attitude of humility that will allow us to create landscapes, yet maintain a proper sense of generosity toward nature. It seems ethically essential that we give our first attention to nature itself, by conserving natural ecosystems, before turning to our constructed gardens and landscapes. This is a lesson we largely have yet to learn but I think we are making progress. ✿

Photo by Claire E. Sauyers

The Source of Our WildFlowers: The Modern Flora of North America

C. Ritchie Bell

When we garden with native and naturalized wildflowers, we garden not only with nature but also with history. Since many of our showy wildflowers have been of medicinal, economic or other importance in earlier cultures, the historical aspect often adds further insight and enjoyment to our gardening efforts.

Many of the *native* plants among the wildflowers in our gardens today are a part of the vast array of strange, useful and beautiful plants of the "new world" that provided the early European explorers and settlers with the food, fuel, shelter and medicines necessary for survival. Other wildflowers we grow may actually be colorful plants from other lands that have been introduced into America and *naturalized* — that is, they grow wild, they thrive and spread without human help. A cur-

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***C. Ritchie Bell**, professor of botany and, for 25 years (1960–1985), director of the North Carolina Botanical Garden, is active in public education and conservation concerning our native plants. He wrote North Carolina's current plant protection law; and was co-author of the* Manual of the Vascular Flora of the Carolinas *and two popular books:* Wild Flowers of North Carolina *and* Florida Wild Flowers and Roadside Plants. *He received the 1979 National Council of Garden Clubs Silver Seal Award for work in conservation.*

Shaw Arboretum outside St. Louis maintains several prairie areas. This one is filled with the blossoms of coneflower. Shaw is in the foothills of the Ozarks.

rent printout from the extensive computerized Kartesz database for North American plants at the North Carolina Botanical Garden shows almost 3,000 species, or about 16% of our total flora of some 18,000 species, to be introduced. Perhaps, when our records are complete, we will find that about half of these introduced plants are now truly naturalized while others may only be waifs or rare escapes from cultivation that do not survive without human care.

Some of our naturalized plants are so prolific and so adaptable biologically that, despite their interest, beauty or fragrance, they are often considered to be weeds! The dandelion (*Taraxacum officinalis*, from Europe), Queen Anne's Lace (*Daucus carota*, from the Afghanistan area by way of Europe) and Japanese honeysuckle (*Lonicera japonica*, from Japan) are good examples of introduced plants that have become weedy. However, even though considered weeds in many situations, these plants may still have a valid place in a wildflower garden if they are appropriately confined.

Not all weeds, however, are introduced plants. With the clearing of the forests over the past three centuries and the disruption of the stable, mature or climax plant communities, quite a few native American plants, such as the blackberries (*Rubus* spp.), poison oak and ivy (*Toxicodendron* spp.), wild onions (*Allium* spp.) and even cattails (*Typha* spp.) have spread rapidly and become terrestrial or aquatic weeds in many areas. Indeed, if we define a weed as "any plant growing out of place" we can see why some attractive but prolific native plants, such as the rhizomatous wild ginger (*Asarum canadensis*) or the common blue violet (*Viola priceana*), or even the beautiful New England aster (*Aster novae-angliae*) and cardinal flower (*Lobelia cardinalis*) can, without some control, become a weed in our wildflower garden. Thus the term "weed" and "wildflower" can only be defined in specific contexts and through the eyes of the beholder. For example: little bellwort (*Uvularia sessilifolia*), a delicate spring ephemeral of the southern Appalachians, is often listed as a desirable perennial for the wildflower garden and, oddly, it is also listed as a weed by the Weed Science Society of America. Indeed, among the nearly 2,000 plants on this subjective and unofficial list, one finds a number of showy natives (the bladderworts, *Utricularia* spp. for instance) that are also on

There are over 100 different plant communities in North America. The plants of each are adapted to a specific climate/soil combination. This coastal area is in California along Route #1.

Photo by Claire E. Sawyers

one or more of the various state lists of "rare and endangered" native plants. So don't fear having a few attractive "weeds" in your wildflower garden!

The great diversity of plant life in North America was a source of amazement to early explorers and, of course, reflected the great diversity of climates, soils and local environments within this vast area. Every new range of mountains, every new river valley, and each new strip of coastal dunes or swampland provided new plants of such interest, beauty or utility that fine timber, drugs and plants of horticultural value soon made up many of the cargoes bound for Europe from the Colonies. As these living plants from America became established in the gardens of Europe, they gave substance to the seemingly outlandish reports of the early explorers who told of huge *evergreen* trees (*Magnolia!*) with fragrant flowers nearly a foot across, or of plants with hollow leaves (*Sarracenia*) that trapped insects, or even of a plant (*Dionaea*) with leaves that moved to trap insects!

Many of the same botanical treasures of America such as foamflower (*Tiarella cordifolia*) and cardinal flower (*Lobelia cardinalis*) that were entering European hor-

ticultural circles 200 years ago are often plants we find to be attractive subjects for our wildflower gardens today. However, we must be realistic in our selections from the much larger number of native species now known and available to gardeners. We must keep in mind that certain groups of tree, shrub and herb species are adapted to grow together as a "plant community" under a particular set of environmental conditions (temperature, light, soil, moisture) and will do best in your garden if provided with conditions similar to those of their native habitat.

Most gardeners are familiar with the 10 minimum temperature zones of North America, reproduced in many seed catalogs as the "plant hardiness zone" map (see p. 99 herein), which shows a minimum temperature range from the −40° to −30°F of the sometimes frigid Zone 3 to the usually subtropical 30° to 40°F minimum of Zone 10. These 10 temperature or "climatic zones" overlay a mosaic of a dozen or more different kinds of soil (sand, clay, loam, etc.) which, in turn, may have different altitudes, slopes, acidity or water-holding capacity. As a result of the various combinations of environmental factors we find a corresponding variation in the plant communities. Thus over 100 specialized plant communities, each generally named for the dominant cover plant or plants in the association, have been recognized for North America. The plants of each of these communities are adapted to a specific major climate/soil combination and some of these major plant communities cover, or originally covered, thousands of square miles. Today, however, urban growth, road and highway construction, our agricultural needs, and our need for paper, timber and other forest products have reduced many of these once vast dominant-plant communities to small remnants tucked away here and there protected by concerned groups and individuals as reserves or special conservation areas.

West Virginia's forests are mixed southeastern forests. In many areas where logging has cleared the land second- and third-growth pines have replaced the hardwoods.

Along the East Coast the major plant communities are forests such as the evergreen Spruce-Fir Community of high altitudes and latitudes, with the Beech-Maple, Mixed Mesophytic and Pine-Oak-Hickory Communities at the lower altitudes and latitudes. However, in many areas second- and third-growth pines have replaced the hardwoods as they have been logged. Some of the smaller, more specialized and often more botanically unique plant communities of the Northeast are such associations as the Pine Barrens of New Jersey, the Cedar Glades of Tennessee, Missouri and Alabama, the Southern Coastal Plain Pocosins, the Southern Cordgrass Prairie and, of course, the Everglades of southern Florida.

In the Great Central Plains, some of the important original grassland associations were: the Bluestem Prairie, Grama-Buffalo Grass and Bluestem-Grama Prairie. Further west we find major areas of the Great Basin Sagebrush Community, Creosote Bush, Mesquite-Acacia Savanna, Palo Verde-Cactus Shrub, and Chaparral Community. Along the West Coast itself some of the major plant communities, again often found now only as protected remnants of once widespread plant-cover types, are the Redwood Forest, Douglas Fir Forest, Juniper-Pinon Woodland, Oak-Juniper Woodland, Coastal Sagebrush, and of course, the grasslands or California Steppe.

Each of the above major plant communities has its own distinctive group of colorful, interesting, annual and perennial herbaceous plants which make excellent choices for wildflower gardens and are often easy to grow in gardens within those regions that provide the soil, moisture and temperature conditions to which the plants are adapted. Within each major plant community are, of course, numerous small and more specialized plant populations and communities specifically adapted to, and often limited to, a relatively infrequent combination of very specific soil, moisture, light and temperature factors. Some of these highly specialized plant communities may be defined primarily by specific soil factors; for example, the Shale Barrens and Diabase Dike communities of the East or the Serpentine communities of the West. Others, such as the plant communities found on the shallow soil of granite outcrops, are adapted to highly acidic pools, seasonally available, on these bare-rock surfaces. Plants of the famous cranberry bogs of the Northeast also thrive in highly acidic, but almost constantly wet, conditions of the sphagnum/peat substrate.

Many beautiful wildflowers of the more highly specialized plant communities are so strongly adapted to the special conditions of these communities that they are found nowhere else. Such plants of specific, usually restricted, habitat and range are referred to as "endemic" plants and, because of their restricted range and generally small population size, may be quite rare. Fortunately, more and more of these rare endemics, determined by botanists to be endangered, are being given

Photo by Claire E. Sawyers

legal protection by the Federal and state governments to help save them from extinction by overzealous plant collectors, uncontrolled commercial exploitation, or the thoughtless destruction of their specialized habitats. However, these highly specialized plant communities can still provide many other beautiful wildflowers for those gardens where the specific habitat requirements for such species can be rather closely duplicated.

Mt. Rainier provides a panoramic backdrop for a field of lupines in the foreground. Native species will do best in the garden with conditions similiar to their native habitat.

Among our endangered endemics (and the "difficult or impossible to grow" wildflowers) are many species which have, in addition to very specific soil, climate and light requirements for growth, a very complex nutritional association with specific fungi that live in the roots of the plants and actually provide some (or all!) of the food or certain raw materials needed by the host plant to grow, flower and set seed. In many cases, we do not even know the name of the fungus in these intricate symbiotic relationships, let alone what *its* environmental requirements are — and, if the fungus dies, its host dies. This is why the "mycorrhizal plants", such as Indian pipe (*Monotropa uniflora*), pine-sap (*Monotropa hypopithys*) and snow plant (*Sarcodes sanguinea*) in the Monotropaceae, or Indian Pipe Family; small whorled pogonia (*Isotria medeoloides*), the lady-slippers (*Cypripedium* spp.) and most other members of the Orchidaceae, or Orchid Family, cannot be transplanted and should *not* be attempted in the wildflower garden. On the other hand, some of our showy and interesting parasitic wildflowers such as Indian paintbrush (*Castilleja* spp.) which is parasitic on the roots of grasses and some shrubs, false foxglove (*Aureolaria*, spp.)parasitic on the roots of oaks and beechdrops (*Epifagus virginiana*), parasitic on the roots of beech can often be grown from *seed* if you have the appropriate host plant in your garden.

To have a more beautiful, healthy and carefree wildflower garden, learn the lesson of our plant communities. If you live on the seacoast, you should certainly plan a garden of native and naturalized coastal wildflowers (but remember that the plants of the eastern and western seacoasts are certainly quite different!); if you live in the mountains (eastern or western, see above!), put mountain plants in your garden. If, within a given region, your garden has some special environmental condition such as a moist area, a shady area, an open area or specialized soil type, you can almost guarantee success with your wildflower garden by planting each "habitat" with those trees, shrubs or herbs of your region that are naturally adapted to your particular combination of conditions.

Generally, the more widespread a particular plant species, the more generalized are its environmental requirements and the easier it will be to raise in your garden. Conversely, the more geographically or ecologically restricted a plant species, the more specialized and specific are its environmental require-

ments and the more difficult it may be to grow under other soil, moisture, light or nutritional conditions. Of course, the greater the challenge such plants offer the grower, the greater the satisfaction in growing them and the more valuable the propagation and cultural information derived from the gardener's records of successes and failures in the propagation and establishment of such "difficult" plants in their gardens.

Maine's Isle-aux-Haut has its own unique set of environmental factors that play an essential part in the forming plant communities found there.

Photo by Claire F. Sawyers

Creating a Natural Looking Garden

Darrel G. Morrison

The creation of natural looking gardens does not result from simply "letting things go." As appealing as that concept might be, from the standpoint of time and energy, there have been too many environmental changes on most residential sites to make that a realistic option. For example, much of the native vegetation has been removed and replaced with imported plants. Hence, a *laissez-faire* approach under such conditions is likely to produce a chaotic mix of native and exotic plants. The process of recreating a natural landscape, or even a natural looking garden requires conscious manipulation and "design."

How do you go about designing "naturalistic" gardens? As a landscape architect convinced of the value of natural appearing landscapes and, as a teacher, I would like to share observations that I have made during the past couple of decades of working with both natural and designed landscapes.

First of all, we can't design gardens that will equal the order, complexity, integrity and beauty of the typical undisturbed natural landscape. But we can learn about design from the processes and forms that occur in such natural landscapes.

Sadly, there are few examples of minimally disturbed natural landscapes remaining. However, due to the efforts of some far-seeing individuals and organizations such as The Nature Conservancy, there are still, in many regions of the country, representative examples of naturally evolved landscapes which can provide both information and inspiration.

During the past 15 years I have taught field courses that deal with the composition, structure and aesthetic characters of native plant communities. These experiences have convinced me of two things: (1) there is great value in studying natural landscapes and native plants in the field, where one can hear, see, smell, touch and even taste them; and (2) the natural landscapes for study and enjoyment are more critical than ever as more and more of our land is "developed."

Lessons from Nature

An important concept is the presence of *plant communities* or *associations* of plants that frequently occur together under specific environmental conditions within a particular region. When these associations have not been greatly disrupted by human activity, there is an order and a visual harmony present, resulting from the fitness of the plants to that environment.

A plant community may be defined as "a group of plants living at a particular place at a

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***Darrel G. Morrison** is dean of the School of Environmental Design at the University of Georgia, Athens, GA.*

The naturalistic gardens we design are simplifications and stylizations of natural landscapes. Yet they can have the "essence" of nature about them as this garden does.

Drawings by Peter K. Nelson

Staphylea trifolia *(bladdernut)*

particular time." Plant communities may be identified by some of the key species in them (e.g., the oak-hickory forest, the beech-maple forest), or by their environmental characteristics (e.g., the floodplain forest, the sandy ridge forest). Rarely is a plant community a sharply defined entity. Instead, one community may grade almost imperceptibly into another. Nevertheless, the plant community provides a framework within which we can approach the design of natural appearing gardens. Several characteristics of naturally evolved plant communities are useful as a basis for designing naturalistic gardens:

1. **Species composition.** A good starting point is to determine the key species that occur together in a specific environment; for example, on a dry, south-facing slope with rocky soil or on a moist, north-facing slope with deep, rich soil. Learn what the *dominant* species are; that is the major plants that have the greatest influence on the community. In a forest, the dominant species are typically the canopy or over-story trees. In a prairie, they are the grasses.

Next, learn which species are most *abundant* or *prevalent;* that is the ones that occur in greatest numbers, whether they are the canopy trees, the middle-story trees and shrubs, or the ground-layer vegetation. Then, learn additional species which are critical to the visual character of the community. They may be species with distinctive branching, flowering or outstanding fall color that makes them important visually in the natural model *and* hence, in designed landscapes based on that community. I refer to these as the "visual essence" species.

2. **Plant distribution patterns.** With an understanding of the most important species in a plant community, the next step is to observe the distribution of each species. There are two different aspects to plant distribution within a community: (a) the species' distribution relative to micro-climates (Does a plant grow only at the edge of the woods, does it grow only on the interior, or both? Does a plant grow only on the upper, drier slopes, or on the lower, moister slopes, or both?); and (b) the species' characteristic degree of aggregation or "clumping" (Does the species usually grow as an individual, or in loose colonies, or in dense clumps?). Knowledge of the distribution of a species within a plant community has obvious implications in planting that species in a designed setting.

Some of the above information can be obtained from books or other publications. Or it may sometimes be obtained from local botanists, but the best way to learn it is through first-hand observation, preferably with someone who is familiar with the regional vegetation.

Pinus strobus *(Eastern white pine)*

Cornus racemosa *(panicled dogwood)*

3. **Natural order.** In undisturbed natural landscapes, we often sense an order or unity that is missing from the human-dominated environment. Natural order is not a simplistic, orchardlike order. Instead, it is a subtle order that results from the repetition of lines, forms, colors and textures within a particular plant community. For example, in a temperate North American forest, limited numbers of tree species will dominate the canopy level. In the Midwestern prairies, 90% of the vegetation is comprised of five or six grasses with their fine textures unifying the landscape.

4. **Variety and diversity.** While there is visual harmony or unity resulting from the limited array of species within a specific environment, there is also visual variety and diversity. For example, while the tree canopy may be made up of a half-dozen species in a woodland, the ground layer beneath may typically include nine to twelve species per square meter. And while the prairie is mainly composed of fewer than 10 species, there may well be an additional 50 or 60 species-per-acre occurring in small numbers. Additionally, visual diversity results from varied spacing and different ages and sizes of plants within an area. Ephemeral qualities, such as changing flower and foliage displays, also contribute seasonal diversity.

5. **Spaces and edges.** The shape of natural open spaces provides useful guidance for designing spaces. In nature, the river provides one of the most useful analogies for garden designers. A river winds through a landscape, widening at turns or bends, and disappearing behind "peninsulas" of vegetation. This provides an element of mystery, encouraging the observer to want to see what's beyond the next bend.

Enclosing vegetation usually has younger, shorter shrubs at the front edge. Also, rather than a continuous, consistent wall of enclosing vegetation, there are individuals or clumps of plants advancing into the open space, and points where the space penetrates into the enclosing vegetation. The result is a softness to the edges in nature, unlike the hard edges we see in urban settings.

Designing the Garden Using Natural Principles

The naturalistic gardens we design are simplifications and stylizations of the natural landscapes they emulate. Yet they can have the "essence" of nature about them, particularly over time.

Here are some steps in the design of a naturalistic garden, and some suggestions of ways the lessons we've learned from nature can be applied:

Site analysis. An important first step is to gain an understanding of the environmental characteristics of the proposed garden site. For example, determine the soil type(s), sun/shade distribution, relative moisture and existing vegetation. In regard to existing vegetation, we need to know both the plants that are undesirable and therefore may need to be suppressed or removed, and the desirable plants that will contribute to a natural appearing landscape. A "purist" philosophy suggests removal of any exotic species; in reality, compromises may need to be made.

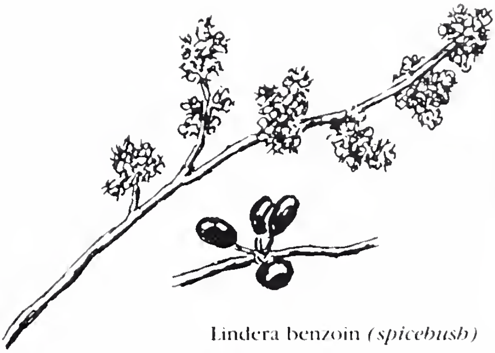
Mass-space plan. The next step is to develop the spatial form of the garden. There will almost certainly be a pathway or system of open spaces in a garden. The form of these might well emulate the river with its gentle to sweeping curves, and its partially concealed spaces. The "river of space" may be translated

into a pathway surface, or a mulched area or lawn (acknowledging that the garden is a stylized form of nature). Next, lay out zones of vegetation within different height ranges; for example, ground-layer plants below three feet in height; middle-story shrubs and small trees in the three to fifteen feet height range; and taller, canopy trees. Laying out these zones—on paper and/or on the ground—will be very helpful to provide the "structure" of the garden.

Plant selection. The next step in the design is to select the plant species for the different height zones of the plan. With an understanding of environmental conditions on the site and of the needs of the native plant communities in a region, you can simply select species from the appropriate community(ies) for the native garden. In general, the closer you adhere to this principle, the more likely you will be to have a unified, harmonious garden. But there may be situations in which exotic species are selected; for example, to expand the blooming period. Some precautions to doing that: (1) avoid introducing species whose flowers will overpower the native species; and (2) *always* avoid plants that have been known to get out of hand and invade surrounding natural areas. Purple loosestrife *(Lythrum salicaria)* is a prime example of such an aggressive species.

Plant placement. Having selected a palette of plants for a naturalistic garden, arranging those plants within their respective zones is the next step. A simple but effective approach is to delineate the different vegetation zones, and then use color-coded stakes to locate individual plants within each zone. While it is unlikely that you can initially plant at the same density as nature does, the same principles of distribution can be followed; for example, "drifts" of some species may flow through the zone; other species that occur as individuals in nature may be distributed similarly in the garden. There may well be spaces between plants or drifts of plants which are mulched, providing an environment for the natural spread of the initially planted vegetation.

A group of trillium, lilies-of-the-valley (these plants were introduced from Europe and are often difficult to eradicate once established) and Solomon's seal brighten a woodland garden in early spring.



Lindera benzoin *(spicebush)*

In the case of meadow- or prairie-like plantings, zones may be identified for different seed mixes, rather than for the placement of individual plants.

At edges, where plants meet the pathway or open spaces, the slightly undulating, irregular edges of nature may be emulated through the plants' placement.

Change over time. Just as a natural landscape is ever-changing, so is a naturalistic garden. In fact, one of the great rewards of naturally based design is that it will change as plants increase and "migrate" into hospitable niches. In the early years of a naturalistic garden's evolution, it is particularly important to watch for intrusions or reappearances of aggressive exotic species that may take over. Also, as conditions change; for example, as more shade develops, additional plants or seeds may be introduced, and others will be shaded out. Finally, in order to perpetuate the composition, selective removal or pruning may be necessary.

Summary

Natural appearing landscapes do not "just happen" in our previously disturbed environment. But they can be designed, planted and managed so that they resemble the natural landscapes which inspired them. Studies of relatively undisturbed natural landscape provide one of the best ways to learn principles of design that can be incorporated into the gardens.

Acquiring Native Plants for the Garden

Mary Pockman

In choosing plants, gardeners who cherish the plants of wild places add another criterion to the usual emphasis on quality: conservation. We seek to acquire the best garden plants, and to acquire them in ways that respect the integrity of natural communities, in all their beauty and diversity.

The criterion of quality is familiar to all gardeners. Peonies or penstemons, Kurume azaleas or mountain laurels, the plants of choice are always those that in appearance and vigor will add most to the place and special mood that the gardener envisions. By this standard, the plants to select are those intentionally propagated for garden use, something that hardly needs to be said about familiar cultivated plants.

When it comes to wildflowers and other native species, however, intentional propagation cannot be taken for granted. Many if not most of the plants now available have been removed from their wild habitats. Plants dug

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***Mary Pockman**, a conservationist and longtime wildflower enthusiast with a weakness for ferns, is past president (1985–1988) of the Virginia Native Plant Society. She began using native species in her own garden in northwest Connecticut in the 1960s. In her present garden, in suburban Washington, D.C., she grows some 70 native species.*

Propagated plants are generally healthier and better looking with more compact and vigorous root systems than wild-collected ones. Nursery-propagated plants are becoming more readily available.

Photo by Claire E Sawyers

from the wild are generally much less satisfactory in the garden. Moreover, wild collection for garden use is a dubious practice in terms of conservation. Many native species are already under severe pressure because of shrinking natural habitats and a compromised environment.

To avoid jeopardizing wild populations and yet obtain the highest quality plants, it is best to search out propagated plants and decline those dug from the wild — with the exception of plants removed from sites where they would otherwise be obliterated. Putting this policy into practice is not difficult, but it does require attention and care.

The advantages of propagated plants are clear cut. Unlike plants that have come to maturity in the wild, they have been grown under favorable conditions and protected against serious pests, competition and undue stress. They are thus generally healthier and better looking, with more compact and vigorous root systems. Wild-collected plants often disappoint gardeners by sulking or disappearing completely; propagated plants far more consistently live up to expectations.

The argument against wild collection on grounds of conservation is more complex. Horticultural collection is extensive, and it is potentially harmful; that much is clear. There is little systematic information, however, about its extent or, more important, its impact. (Much, or even most, wild collection is believed to be illegal, violating laws regarding theft, trespass or taking from public lands; this could in part explain the lack of data.) Moreover, there is constant change in the practice of wild collection itself, in its environmental context, and in perceptions of its risks.

Not too long ago, digging garden plants from the wild was the usual practice, rarely questioned. A few enthusiasts grew their own, but nurseries and horticulturists for the most part ignored native species. In the eyes of most people, America's vast uncultivated lands and their plants were a limitless resource.

As wild lands have been steadily converted to human use and the shadow of environmental problems has spread, that blithe optimism

Penstemon smallii *seedling is well rooted in a light starting mix and is ready to be moved into a larger pot.*

has waned. In its place is growing appreciation for the value and the vulnerability of the natural world, and mounting opposition to practices that may threaten it. Especially as the surge of interest in native plant gardening has pushed demand for plants to new highs, wild collection for garden use has come under increasing criticism.

To the native flora as a whole, horticultural collection is a far less serious threat than habitat loss or such far-reaching changes as deteriorating air and water quality. It can add to other stresses, however, by reducing the size and genetic variability of local populations, disrupting complex ecological relationships, and physically damaging habitats. For species and plant communities already hard-pressed, continued wild collection has the potential to do significant harm.

The commercial trade in collected plants is estimated to involve hundreds of species sold by a profusion of dealers, from nurseries to hardware stores. Sales of a popular species may well total several hundred thousand plants a year. One Federal investigation, for example, documented a year's shipments of more than 75,000 wild-dug orchids by one dealer alone. To plants collected for sale must be added those dug by individuals for their own use.

What's known about the harm done by wild collection is patchy. Horticultural collection is cited as a major factor in the decline of some species, such as the white fringeless orchid, *Habenaria integrilabia*, listed as endangered in Tennessee, and it has virtually eradicated some readily accessible populations of others. Some species are of concern simply because the demand, and thus the number of plants collected, is so great. Others are considered vulnerable because of intrinsic characteristics such as rarity, slow natural reproduction, limited adaptability, or occurrence in fragile habitats. Most at risk may be species that are both much in demand and inherently vulnerable, such as some alpines and cacti or certain lady's-slippers.

Conservationists generally conclude that the risks of horticultural collection are unacceptable, particularly since any harm that results may be irreparable. Given the extent of commercial collection, it may be tempting to rationalize that the number of wild-dug plants one gardener could possibly use makes little difference. It's never just one gardener, however. The cumulative power of many trowels is considerable, and individual purchases of wild-dug plants add up to the demand that perpetuates wild collection.

At the same time wild collection is falling from favor, nursery-propagated plants are becoming much more widely available. Spurred by the popularity of native species, propagators have made substantial advances in finding ways to handle them, including micropropagation, and this progress is continuing. New nurseries propagating everything they sell have come into the wildflower trade, and established nurseries are propagating more species as effective methods make propagation more profitable than buying from diggers.

Selective breeding of native species is also adding to the availability of propagated plants. Like such garden staples as bearded iris and hybrid daylilies, the resulting selections and cultivars are available only through propagation. The increase in their number, and the expanding use of American natives in formal as well as naturalistic settings, are together blurring the distinction between traditional gardening and wildflower gardening, not only in style but in the origin of plants.

The overall effect of these changes is a gradual shift away from wild collection toward propagation of wildflowers and other native species. It is far from complete, however. Long-standing attitudes and practices are slow to change. In addition, growers do not yet know how to propagate some of the most coveted species, and production of others is still too difficult or slow to appear profitable.

During this period of transition, conservation-conscious gardeners need to begin the search for plants with some knowledge about the species that attract them, in particular their propagation and cultivation requirements. Those who choose to buy plants must also look critically at possible sources, recognizing the realities of growing and selling plants as a business.

The simplest strategy is to plan a garden that uses only species that can readily be propagated—not a severe limitation—and to acquire plants either by growing them at home or by buying from nurseries that propagate all their stock. Gardeners able to devote more time and energy to obtaining plants can expand their choices through plant rescues, propagation of more exacting species, and careful checking of other sources.

Given constant change in propagation techniques and nursery practices, any guide to acquiring plants is necessarily general. Up-to-date information is available from a number of publications and organizations (see source lists, p.100); what follows is intended to help put it to work.

A rewarding way to make sure where plants originate is to take charge of the process personally. One time-honored source, a friend's garden, is as appropriate for wildflowers as for other plants. Many species are easy for home gardeners to propagate, including some for which nursery production is not yet feasible. A number of publications give excellent advice on propagation methods, and on obtaining seed, spores or cuttings without reducing the reproductive capacity of wild populations.

Osmunda claytoniana *(interrupted fern)*
Drawings by Peter K. Nelson

Relocating plants that otherwise face certain destruction can provide mature specimens as can the plants of species that are not commercially available, including stock plants for home propagation. To improve the chances that rescued or salvaged plants will thrive, minimize the stress of transplanting and give them extra attention.

Plant rescues should have the permission of the landowner, and no plants should be removed from parts of a site that will remain undisturbed. While it's possible for individuals to rescue plants on their own, landowners are more likely to give permission and detailed information to an organized group, such as a garden club or native plant society, especially when a large tract is involved. (For more detailed suggestions on organizing a plant rescue, see Harry R. Phillips, *Growing and Propagating Wild Flowers,* 1985, Chapel Hill: University of North Carolina Press.)

Buying plants is more complicated. Whether plants for sale are nursery propagated or wild collected is sometimes almost impossible to know for certain. The mix of wild-collected and nursery-propagated plants on the market varies widely from one species to another, and few retailers state the origin of the plants they offer. The greater the probable risk of wild collection to the species, the greater the caution that should be exercised in buying plants.

The most straightforward purchases are of plants that for all practical purposes cannot be wild collected—selections and cultivars, as well as at least one species, *Franklinia alatamaha*, that has been extirpated in the wild. Many, such as *Monarda didyma* 'Cambridge Scarlet,' are well established in the trade and widely available; those more recently introduced, such as *Kalmia latifolia* 'Olympic Fire,' may be harder to find. Some are naturally occurring but uncommon variations, including double forms such as *Sanguinaria canadensis* 'Multiplex' and albinos such as *Lobelia cardinalis* 'Alba'. While an occasional plant could be collected, to dig

Hibiscus moscheutos palustris

(swamp rose mallow)

such forms in quantity would be virtually impossible.

At the other end of the spectrum are species that are virtually always wild collected. Some appeal to too few gardeners to make commercial propagation worthwhile, even though it may not be difficult. More prominent are much-wanted species that so far cannot be propagated or grown on a commercial scale, notably the native orchids, most of which present formidable problems in both propagation and cultivation. Until nursery production of these species becomes feasible, the best choice is to forego buying them; enjoy them in the wild and watch for opportunities to rescue plants.

Between these extremes lies a large and sometimes bewildering group of species that can be and are propagated, but are also collected. Whether one or the other is the more common practice depends on a number of factors, mostly related to the economics of the nursery business. Many are hard for customers to assess.

As a general rule, species that are tricky to propagate or slow to reach marketable size, and thus expensive to produce, are more apt to be wild collected; trilliums, which commonly take five years or more from seed to flower, are one example. Those that are easy to propagate and quick to mature, such as cardinal flower and columbines, are more likely to be nursery propagated. The cost and availability of wild-dug plants must also be considered, however, and many factors besides production cost enter the equation. In any case these are only probabilities, not much help in a particular situation.

Price, by the way, is not a reliable guide. Propagation may be more expensive than wild collection, but expensive plants are not necessarily nursery propagated. Large plants of a slow-growing species, for instance, are generally expensive, and they are very apt to be wild collected.

Some understanding of this background is helpful, but in buying plants of species in this confusing group, a critical look at particular sources is indispensable.

Easiest to start with are those that state explicitly that all the plants they sell are nursery propagated; some add that they do not sell wild-collected plants, and explain why. (What they say isn't necessarily true, of course; it's prudent to test it against what they sell. Would-be deceivers seem more apt just to dodge the issue, though.)

Among this group are some nonprofit organizations committed to native plant conservation. Native plant societies and botanical gardens with a special interest in natives, for example, quite commonly combine public education and fund raising in sales of plants they have propagated.

A small but growing number of commercial nurseries, including many that accept mail orders, also make a point of telling customers that all their wildflowers and native plants are nursery propagated. Although a few are large, general nurseries, most are relatively small. Many of the latter grow all the plants they sell, and their lists often include species that are relatively unfamiliar, or that volume nurseries consider unprofitable to propagate.

The great majority of nurseries, mail-order dealers, and garden centers say nothing about how they acquire plants. No particular meaning should be read into their silence; it's customary for those who sell plants to focus on descriptions and cultural requirements. Don't be misled, however, by phrases that convey no information about the *origin* of the plants, such as "nursery grown" or "field grown," "specially selected" or "bred for garden success." Note other characteristics as well; a feverish sales pitch, careless nomenclature, sketchy cultural information may suggest more serious interest in profits than in plants.

The words to look for are *nursery propagated.* In the absence of that phrase or an unambiguous equivalent, ask the origin of the plants. Those who know their plants are nursery propagated will say so without hesitation, but some may not know for sure. Nonanswers or evasions, however graceful, should trigger further questions, or send you to another source.

One frequent reply is that plants come from one or more wholesalers. Most local garden centers and probably a majority of mail-order retailers do buy from other nurseries, but they should know or be able to find out how their suppliers obtain plants.

Two common replies may leave unanswerable questions. One is that the plants have been rescued. Some people familiar with the trade maintain that most wild collection is from sites where destruction is imminent, but they also acknowledge that some plants labeled "rescued" have been dug from sites where there is no prospect of disturbance. When the claim of rescue is valid, it does answer objections to wild collection on conservation grounds. Without personal knowledge of the seller and the rescue site, however, its legitimacy is almost impossible to determine.

The second is that plants have been harvested from wild populations on a sustained-yield basis. That is theoretically possible, at least for common, abundant species, although lack of information about population dynamics in a changing environment may make it difficult to determine what yield is sustainable. Like the claim of rescue, however, the claim of carefully gauged harvest is extremely hard to verify. The likelihood that rescued or harvested plants will succeed in the garden is the same as for any wild-collected plants.

As a cross check on the answers a source has given, or when those answers are ambiguous, examination of the plants themselves may give clues to their history. If possible, look at several plants of a species, not just one. Does it seem more likely that they were dug from their wild habitat, or reared from the beginning under nursery conditions? This approach is useful in a local garden center, where it may be difficult to get questions answered, but it can also be instructive as an after-the-fact assessment of plants bought by mail.

Look at the plants' general health. Poor color, sparse foliage, weak stems, legginess, old wounds, all suggest wild collection, not to mention what they say about quality.

Check the size or apparent age, keeping in mind the investment a nursery must make to produce a large plant. Especially in species that grow slowly, large, or obviously older plants, are more likely to be wild collected—for example, ferns with rootstocks carrying the remains of many fronds. On shrubs such as mountain laurel, watch for good-sized stumps near ground level, typical of a wild-dug shrub that has been cut back to stimulate new growth.

Look at the way the plant is potted. Nursery-propagated plants are usually more or less centered in the pot, and their foliage falls naturally.

Are other plants sharing the pot or the root ball? Fast-growing extras may crop up in the tidiest nurseries, but few intentionally propagate mixed clumps. Bonus plants that are also salable—a garland of ferns at the base of a rhododendron, for example, or a Jack-in-the-pulpit in a clump of foamflower—suggest wild collection.

Turn the plant out of its container if possible. Nursery-propagated plants are usually grown in a light, uniform mix, often containing shredded bark or obviously artificial materials such as perlite. Compacted clay, large stones, or different soils in one pot are more likely with wild-collected plants. Allowing for the habits of different species, the root system of a nursery-propagated plant will be relatively compact; it is unlikely to be lopsided, thin and straggly, or patently crammed into the container.

It seems likely that wild collection will eventually be replaced by propagation, but "eventually" may be some time in coming. In the meantime, through care in acquiring plants, gardeners can both add to their own pleasure and take their stand with all who are working to ensure that wildflowers and native plants remain part of a treasured living heritage.

Two-month-old plant of blue star, Amsonia tabernaemontana, *has been grown from an early June cutting. Extra steps must be taken in treating the seeds of this plant as it has a hard coating.*

Photo by Wil Pickman

Photos by Gottscho-Schleisner

Maintaining The Naturalistic Garden

Richard W. Lighty

The maintenance of gardens is often held to be a tedious and mindless job. It is regarded as something apart from the making of gardens, and this may be true for some public or commercial landscapes; but fine gardening demands continuing personal involvement of the garden maker, not only in planting and renewal, but in the routine care. Gardening is a dynamic art; the product of natural growth and the gardener's wishes, and maintenance is the choreography of inevitable change, daily, seasonally and through the years. Seen in this light, garden maintenance is a creative and enjoyable process which fine tunes the garden to the taste of the gardener.

The tasks involved in garden maintenance are the same for all types of gardens, but the particular approach to accomplishing the task depends on the style of the garden and the preferences of the gardener. Gardens, even

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Black-eyed Susans and daylilies combined with ferns and a selection of shrubs border the garden steps. Naturalistic gardens such as this one require maintenance much the same as any other.

naturalistic ones, differ from nature in two important ways: they require a higher level of interest through the seasons and they require that plants grow in sites we, not they, have chosen. These are also the major reasons maintenance is required. I can't resist adding that this effort is considered a pleasant pastime by a large portion of our population.

The basic tasks of garden maintenance are: the control of undesirable and desirable vegetation; the removal of dead or dying plant parts; and provision for the plants' needs for water or nutrients.

Weeding — The Control of Unwanted Vegetation

There is a variety of approaches to this oldest of tasks and thoughtful gardeners will consider which is most appropriate in each situation. Hand-pulling of weeds, roots and shoots is the most certain and precise. Its disadvantages are in the time it takes and the necessity of stooping or kneeling. It also disturbs the soil which brings new weed seeds to the surface where they quickly germinate. Despite this, it is often the quickest method of eliminating non-rhizomatous weeds from tight ornamental plantings, but it will never eradicate established weeds with extensive rhizomes or sprouting root systems.

Tools and machines such as hoes, cultivators and hand weeders need more room in which to operate than do fingers, but they cover the ground more quickly. They also disturb the soil, bringing a new crop of seeds to the surface and they destroy fine feeder roots of desirable plants. Power cultivators have limited use in established naturalistic gardens, but there are places where hoes and hand weeders can hasten the task without creating a problem. Where plants like trilliums or Christmas fern have a wide "overhang" to shade the soil, hand tools can be used to scratch the surface without increasing the weed problem.

The final method of controlling established weeds is with herbicides. The term encompasses a variety of chemicals that can be dangerous to humans and other organisms that

A woodland garden setting contains a mixture of native species combined with hostas, evergreens and some small shrubs.

share our environment. Care should be taken to use the least hazardous ones in the safest possible way. Always follow the label directions. Herbicides should be used only when they represent the sole practical means of control. In general, I do not advocate the use of persistent, soil-acting herbicides such as the pre-emergence types in common use on some nurseries and farms. All herbicides must be carefully applied at the correct rate. The types I recommend are those absorbed by the green tissues, such as leaves, and subsequently

translocated throughout the plant, killing it slowly and surely. Somewhat less useful are those that kill only the green parts touched by the spray. In the first group we have types which are *selective* and can be sprayed on all vegetation but kill only certain types. The most common of these are 2,4-D and related compounds which kill broad-leaved plants without injuring most grasses. For the naturalistic gardener these can be helpful in keeping meadows weed-free by spot-spraying only the areas of infestation. They will, however, injure or kill broad-leaved ornamentals in the same area if they drift or volatilize excessively. There are several recent additions to the arsenal of herbicides which kill grasses but do not injure most broad-leaved plants (e.g. Poast™, Fusilade™). These, when labeled for use with ornamentals, will be useful where rhizomatous grasses are a problem.

Non-selective, translocated herbicides must be sprayed only on the target weed. Glyphosate (e.g. Roundup™, Kleenup™, Rodeo™) is the most common of these and can be very effective when "dribbled" at low pressure from a sprayer or applied by moist sponge or as a gel (see box page 43). These methods, if carefully used, will avoid any splash or accidental application to desirable plants. For concentrations and restrictions, always consult the label.

The single most important purpose of any weed control measure is to kill weeds before they go to seed (in the case of annuals or biennials) or before their rhizomes or root systems spread throughout the planting (in the case of perennials). By eliminating them when they are small you have the additional advantage of less soil disturbance.

Much effort can be avoided by having all soil covered with either vegetation or leaf-litter so that small weed seedlings can't get started. Gardeners in public gardens with naturalistic plantings have for years used shredded oak leaves as a mulch applied in early winter. If the leaves are chopped to a size of about one and one-half inch, they will settle in to provide a loose blanket, reducing frost heaving of shallow-rooted plants and preventing the germination of weed seeds. The size and looseness allows established plants to come through without problems. Leaf chopping can be done at the time of leaf removal in the fall. Some vacuums (e.g. Roof™) chop and bag as they remove, but hand-raked leaves may be chopped by repeatedly running over the pile with a lawn mower set as high as possible. Oak leaves are the best, but others may be used as long as care is taken to keep the soil pH suitable to the plants being grown. Heavy, leathery leaves should be avoided as mulch.

While its use is restricted by social and safety considerations, the periodic use of fire can help in the maintenance of meadows and certain very specific woodland gardens. Those who feel it might be appropriate should check with their local authorities and with experts in nearby public gardens regarding legal limitations and horticultural advisability. Mowing or use of a string trimmer is an alternative to burning but does not kill weed seeds and seedlings as fire can.

The Control of Beneficial Vegetation

Once the garden has developed as planned, the gardener will be in the enviable position of spending more time controlling the desirable plants than fending off invaders. But it still takes time, and the following approaches will ease the task.

Select your herbaceous plants carefully, not only for aesthetic attributes, but to avoid excessively invasive plants. In general, gardeners who let bishop's goutweed (*Aegopodium podagraria*)*, yellow archangel (*Lamiastrum galeobdolon*)*, gooseneck loosestrife (*Lysimachia clethroides*)* or their like into the naturalistic garden, will live to regret it. Also know what you are doing when you plant garden phlox (*Phlox pan-*

A flagstone walk planted with violets and bordered by ferns and mayapples makes the transition from garden to woodland—this one located in Delaware.

iculata), foxglove (*Digitalis purpurea*)*, fountain grass (*Pennisetum alopecuroides*)* or others that seed themselves profusely. While the methods outlined for weed control apply generally to the control of ornamentals, translocated herbicides should not be used on the latter unless you wish to eliminate the plant entirely.

Even those plants that are clump formers may spread fast enough to become a threat and all will ultimately need division and resetting if they are well cared for. Plants should be carefully selected and spaced so that the ground is covered in a year or two and still permit the plant to grow for five to ten years before needing division. Since rate of growth is affected by many factors, each gardener must experiment to arrive at the best approach for a particular site. The usual mistake is to plant too closely so as to produce a quick effect, and this necessitates frequent division. Gardeners should carry pruning shears and constantly trim back the edges of vigorous plantings to keep them from overgrowing less hearty neighbors.

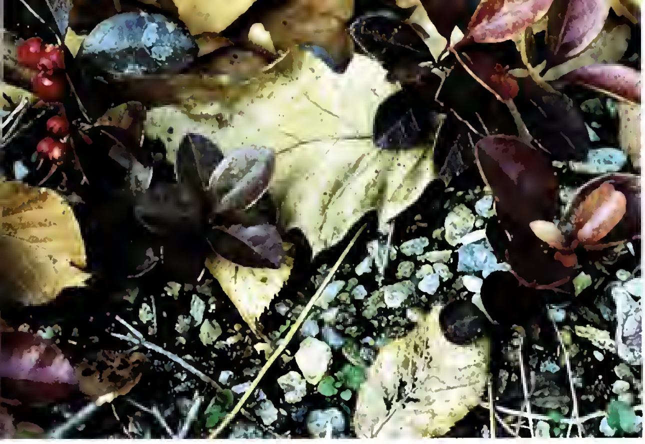
The control of desirable woody plant growth is more straightforward. The most important requirement is for gardeners to understand the growth habits of their plants; where long growth occurs, where buds which give rise to new shoots are found, what the effect will be of removing a particular shoot, and what the ultimate size and character of the plant will naturally be. One is then equipped to direct growth in ways that allow all the plants to fit harmoniously into the garden. In general, prune small amounts, do it frequently and begin early in the plant's life. Prune throughout the year, being careful not to remove large portions of the plant in late summer when the resultant new growth will be less winter hardy. Large-scale pruning should be done in mid-winter. When tampering with the canopy, the upper layers of branches in a woodland, gardeners should not be tempted to let too much light in too quickly. This will increase all growth and bloom in the understories, including that of weedy species. After all, naturalistic gardens need not strive for the bloom of a formal bed of annuals. When thinning the canopy, remove branches throughout the crown of the trees, not just at the bottom (limbing up) or storm breakage and blow-downs will result. Another rule is never to alter the natural form of the tree or shrub drastically. The eye will read this as artificial.

The Removal of Dead or Dying Litter

Leaf removal is as essential in a woodland garden with an herbaceous layer as mowing is in a meadow. Without it plants are smothered and reduced in size and diversity. Raking is the simplest, most careful way of removing fallen leaves, but it also is the most time consuming. If you have an area of any size, consider a large-wheeled leaf vacuum which chops and bags the leaves as it removes them. As mentioned before, the leaves can then be compactly piled nearby for return to the same area as mulch in early winter. A pitchfork is ideal for putting on a light and airy cover. Try to wait until rodents have found homes elsewhere before putting the leaves back, although chopped leaves make less desirable cover for these furry foes than do whole leaves. Other, more expensive mulches can be used, but none have the natural look of leaf litter. Bed cleanup can be done as the leaves are removed, but many gardeners enjoy the brown seedheads as an important part of the winter garden. Because of the complexity of a naturalistic garden, bed cleanup requires close attention and hand work, although a skillfully used weed whip can make tasks such as the removal of old flowering stems easier.

Provision for Basic Needs

Again, because any garden is unnatural to the extent that it is a garden, input is constantly required to keep the site as desired. By putting more plants of more sorts in an area than would be found there naturally, we come up against the problem of limiting factors. Whereas in a natural forest, many herbaceous plants go dormant at the onset of mid-summer drought, the gardener strives to maintain contrived effects of texture, form and green throughout the season. Since there are more



Photos by Judy Glattstein

Natural Landscaping

Top: Gaultheria procumbens, *wintergreen, is a charming evergreen ground cover which thrives in humus-rich soil in part shade.*

Bottom: Phlox stolonifera, *woodland phlox, blooms in May. The neat evergreen foliage is topped by soft blue flowers. New cultivars provide lavender, pink and white forms.*

Top Left: *The meadow garden at Garden in the Woods (New England Wild Flower Society) contains* Monarda media *in the foreground with Turk's-cap lily and* Liatris . . . *Garden in the Woods contains the largest landscaped collection of wildflowers in the Northeast.*

Bottom Left: Lobelia cardinalis *attracts a hummingbird at North Carolina Botanical Garden. These plants are located throughout this garden just to attract these tiny birds.*

Right Top: *The Local Flora Section at Brooklyn Botanic Garden contains plants native to areas within 100 miles of the Garden. Shown here are* Dicentra cucullaria *in the foreground and* D. eximia *in the background.*

Bottom Right: *At the North Carolina Botanical Garden a boardwalk provides access to a patch of wildflowers. The Habitat Gardens are the heart of the native plant collections—North Carolina mountains, coastal plain and sandhills.*

Photo by Dorothy Long

Photo by Rob Gardner

Photo by Elvin McDonald

Photo by Ken Moore

Photo by Dorothy Long

Top: Phlox, *pink* Dicentra *and Celandine poppy bloom in profusion at Garden in the Woods. Trails meander over 45 acres where 1500 varieties of wild plants flourish.*

Bottom: *A shady area provides a perfect habitat for* Mertensia virginica, *bluebells, and* Erythronium, *dog-tooth violet.*

Photo by Elvin McDonald

Arctostaphylos uva-ursi *(bearberry)*

plants in a given area than nature usually supports and, since aesthetics-conscious gardeners use moisture-requiring plants in unnaturally dry sites, water becomes limited and must be supplied from sources other than rainfall. While overhead sprinklers have traditionally been used because of their flexibility, they are wasteful of water and can abet the spread of foliage diseases and rots. A new generation of trickle irrigation devices and soaker hoses promises less waste, but these, if installed for a season, have problems of unsightliness in a naturalistic garden and lack flexibility as the garden grows and changes. A general rule for watering, if you must, is to do it as soon as the need becomes evident (not critical), and do it in the very early morning. In normal years watering should not be a major time-consuming task if your garden is planned properly. Burying seasonal water lines before you plant the garden will decrease the need to carefully thread hoses through prized plantings.

Nitrogen becomes a limiting factor in somewhat the same way. Most of us can easily see when a plant is thriving, and we know that "fertilizer" makes this happen. Indeed, we tend to supply too much nitrogen and this has a number of troublesome consequences. It may delay or reduce flowering, make the plant more disease and drought susceptible and by increasing soft vegetative growth, can shorten the life of perennial plants or at least the length of time before they need division. Moderation in the application of all fertilizers should be the rule. I do not fertilize any plantings unless they show signs of deficiency for some element. Usually this is nitrogen, and I correct it with a half-cup of 5-10-10 per square yard. Light fertilization and watering will also help many of the spring ephemerals, such as bleeding heart (*Dicentra eximia*), corydalis (*Corydalis lutea*)* and bloodroot (*Sanguinaria canadensis*), remain green later into the summer.

Several things the gardener can do at the beginning will have a salutary effect on garden maintenance. Burying water and electric lines in convenient spots throughout the garden is one of those. Electrical tools are often lighter, usually less expensive and have fewer moving parts and a lower repair frequency than their gasoline counterparts. For the home gardener they make sense. Design of the garden for maximum path frontage (consistent with the overall aesthetic design) will allow the gardener to plant for higher interest while maintaining less total area. It is the intimate and varied combinations near the path that add delight to the garden. An overall plan at the start will enable the gardener not only to bury utilities and lay out paths, but to phase garden development so that only as much area as can be cared for will be in a disturbed state at any time. As each area matures, the gardener can advance into another. This slow development also allows the gardener to accomplish disruptive tasks like thinning trees, removing shrubs and placing stones before planting, and to gain experience in maintenance and correct early mistakes before embarking into a new area. Unimproved areas can be left as nature leaves them or mowed and kept weed free until you are ready to plant. The alternative is to be endlessly engulfed in tall weeds that must be hand pulled.

Finally, it is hoped that this brief treatment of the most time-consuming (and the least considered) aspect of gardening will inspire gardeners to look at the vexing problems of maintenance with the confidence that by ana-

Amelanchier canadensis *(serviceberry, shadblow)*

lyzing their particular situation and applying appropriate technology to the basic tasks involved, the care of their garden will become as pleasant as its making.

**Editor's note: These plants are not U.S. natives.*

Some Rules of Thumb

1. Don't change conditions in ways that increase maintenance unless the trade-off is worth it.

   Examples: Clearing out brush or opening the canopy increases bloom and the variety of plants you can grow, but it also increases weeds and weed growth. Shade gardens are peaceful in more ways than one.

   Tilling the earth for planting also provides a fertile field for weeds and brings weed seeds to the surface. Limit the amount of disturbed and bare ground by the energy you have to care for it. In a naturalistic garden, living plants and dead litter are the desirable surface covers.

2. Plant for permanence – a function of the plant's persistence within the bounds you have assigned it. An ideal planting will neither overgrow its neighbors nor decline noticeably in vigor over five to ten years so that it needs restoration. Your own experience is the best guide.

   Examples: Use slow-growing, long-lived, clumping plants in combination with lower, shade-tolerating ground covers to control weeds. For example, trilliums or merrybells (*Uvularia grandiflora*) planted with *Phlox stolonifera.*

   Use slow-growing shrubs and trees. They take longer to achieve their effect, but require less control over their long life. A silver maple will provide shade in five years but will threaten the house in another ten, while a white oak will take ten years to give much shade, but will be a solid and well-behaved specimen for several hundred years.

3. Combine tasks to avoid handling materials or reworking unnecessarily.

   Examples: Fall leaf removal can be combined with mulching if a leaf-vacuum/chopper is used.

   Weeding, dead-heading and summer pruning can all be done simultaneously. Make several "sweeps" through the garden each summer and carry with you the tools to do all routine tasks.

4. Look hardest at those tasks demanding most time or effort. A small savings here means much more than a large savings in a trivial task.

   Examples: A technique which reduces weeding time in a newly-planted ground cover is more worthwhile than completely solving the small weed problem existing after it is established.

   Contouring the lawn edges to fit the radius-of-turn of your mower will save a large amount of time spent in hand trimming. It will probably save more than that gained by using string-trimmers or trim mowers in the same area.

5. Try to eliminate tasks that consume even small amounts of time each week or each year, if that task must be repeated endlessly.

   Examples: Careful, slow application of a foliar-applied, translocatable herbicide, to Canada thistle growing in a ground cover will put an end to pulling it or digging it several times a summer, year after year.

   Removal of all broadleaved weeds in

the lawn adjacent to beds at the same time these weeds are removed from the beds will prevent the back and forth seeding from one area to the other. In a few years you will notice fewer weeds in both areas.

Roundup Gel

Ingredients:

1 Liter Water
40 Milliliters Roundup
25-30 Grams Gel Powder (Miller Liqua-Gel)*

Procedure:

1. Place water and Roundup in a blender *not used for food.*
2. Mix at lowest possible speed.
3. Slowly add Gel powder while mixing at lowest speed.
4. Cover and increase speed to high until gel is formed (should be the consistency of mustard).
5. Put Gel mixture into correctly labeled and dated plastic squeeze bottles.

Application:

Apply as a stripe down the center of at least 3 leaves on each stalk. Treat as many stalks as you can and inspect after one week and reapply to those that are still green. Gel should not run. Do not apply before a rain.

*Other inert gelling agents such as carboxymethyl cellulose (Methyl Cellulose) may be used but the amount needed will vary.

Black-eyed Susans mix nicely with tall phlox along this split-rail fence. Select plants carefully and space them so that the ground is covered in a year or two, but will permit the individual plant to grow for five to ten years without division.

Designing with Native Plants: Potentials and Challenges

Darrel G. Morrison

The new, or newly revived, interest in designing with native plants—trees, shrubs, vines, wildflowers, ferns and grasses—presents a whole new series of challenges to the landscape architect. The purposes of this article are: to identify some of the differences between traditional landscape design as it is currently being practiced and new forms of design that rely more heavily on the use of native vegetation and natural processes; and to suggest ways in which naturally evolving landscapes may serve as models for designing landscapes that are both ecologically sound and aesthetically satisfying.

Current Practices

Before discussing the range of potential approaches and techniques for designing with native vegetation in ways that depart to some degree from current landscape design practice, it is appropriate to review those practices as seen in present-day planting design. This discussion is a generalized view and does not take into consideration many individual variations, but it does provide a basis for comparison.

Designing with plants—whether in a traditional mode or in the alternative native landscape approaches—involves two major components: selection of plants and placement of them in the landscape.

Plant selection. In typical contemporary landscape design, plant selection is primarily influenced by:

1. **Aesthetic characteristics** such as the forms, texture and seasonal color characteristics of plants.

2. **Functional capabilities** such as the capacity of plants to provide shade, windbreaks, enclosure, visual screens and erosion control.

3. **Environmental tolerances** such as cold hardiness; drainage requirements; sun, shade and wind tolerance; and, in some urban areas, the ability to survive the effects of pollutants in the soil and atmosphere. The moisture requirements of plants are characteristically given only secondary consideration, because of the relative ease, up to now, of providing regular or periodic supplemental water to plants that require more water than precipitation provides.

4. **Commercial availability.** A very real consideration in plant selection is the availability or non-availability of a plant species. Plant producers, especially the large nurseries, tend to mass-produce large quantities of a relatively small number of species that are well known and reliable. They typically include both native and exotic species, as well as hybrids and cultivars; and for the most part, the plants' origins are not clearly differentiated.

Amelanchier, shadbush, is a small tree which blooms in mid-April. The white flowers are quite showy appearing before the leaves. It is best used in mixed plantings.

Similarly, there is in typical landscape design today little attempt to select a native over a non-native species, if both have similar aesthetic attributes or functional capabilities. For example if designers were looking for a canopy tree with showy yellow fall foliage color for a site in hardiness Zone 4, they are probably as likely to select a *Ginkgo biloba* (ginkgo) from eastern China as a *Fraxinus pennsylvanica* (green ash), whose natural range is central and eastern North America (Wyman, 1951).

Generally, in selecting mid-story trees and shrubs, there is a tendency to select plant species with at least one outstanding aesthetic attribute, such as showy flowers, brilliant fall color or conspicuous fruit. Evergreen shrubs are particularly valued. This is evidenced by the number of conifers such as *Juniperus chinensis pfitzeriana* (Pfitzer juniper); *Taxus cuspidata* (Japanese yew); broad-leaved evergreens such as *Ilex* (holly); and *Photinia serrulata* (red-tipped photinia) in the designed landscapes of different parts of the country.

Similarly, in the selection of ground covers, there is a strong tendency to choose repeatedly a few species that are green all year round. One of the most widespread ground covers in designed landscapes is *Hedera helix* (English ivy). Other frequently selected ground covers include *Vinca minor* (periwinkle or myrtle) and *Pachysandra terminalis* (Japanese spurge). All of these were introduced from Europe or Asia more than a century ago (Wyman, 1949).

Foamflowers, cranesbill, baneberry and ferns combine nicely in this woodland border. Shown also are several lady's slipper orchids which are not recommended for purchase since most are dug from the wild.

Of course the most widely used ground-cover plants in contemporary-designed landscapes are the sod-forming lawn grasses, which are almost without exception exotic species and are typically maintained with substantial inputs of fertilizers, herbicides, water and energy (Diekelmann and Schuster, 1982).

Since neither the lawn grasses nor the other ground covers display conspicuous flowers, color at the ground-layer level is typically provided by seasonal displays of bulbs and annuals.

Plant placement. Just as plant selection tends toward simplicity and order, so do the current practices of plant distribution or placement in the designed landscapes.

Trees are often planted as individual specimens in lawns, or in rows that reflect the geometry of surrounding buildings and streets in urban areas. In larger parks and on institutional grounds, they may be grouped in borders and islands, often spaced regularly at 25 to 30 feet apart, with all trees in a group of a single species and size.

Shrubs may be used singly as accents, or more frequently, they are grouped with other members of the same species and size, equally spaced in rows or mulched beds. Either in a conscious effort to give shrubs an architectonic form or to keep them from outgrowing their situation, they are clipped, creating either square or rounding forms that are dense and compact.

Ground-covering plants are generally spaced closely, at six to twelve inches apart, for a quick, uniform cover. Again, one species is typically used within a specific area in such plantings. Beds of ground-cover plants are usually clearly differentiated from lawn areas and other ground-cover beds, delineated by sunken steel edging or other materials that lead to distinct edges.

Bulbs and annuals, when used, are characteristically planted as solid masses for maximum color effect, although bulbs such as *Narcissus* species may be naturalized in areas covered with a mulch or planted with other ground covers.

Myrica pensylvanica *(bayberry)*

Contemporary traditional landscape management is geared to leaving both the species composition and distribution patterns of plants unchanged. Invading plants are removed, and reproduction of the initially planted individuals is inhibited.

Where feasible, existing trees are often preserved and incorporated into designed landscapes, sometimes at great expenditures of effort and money. Such trees, individually or in groups, tend to provide a link with the region's natural environment. Interestingly, though, where groups of trees are preserved, there is a strong tendency to clear out middle-story and ground-layer species, replacing them with the "cleaner" look of lawns, mulch beds, or monotypic blankets of ground cover such as English ivy.

Differences in cold and heat tolerance lead to some variations in the palette of plants used in different regions. Differing moisture requirements, on the other hand, are often accommodated through irrigation, making it possible to grow plants from a moderate to high rainfall region in an arid or semi-arid environment, or to grow plant species from natural lowland habitats in upland situations.

In summary, one of the effects of much of the current practice in planting design is to produce landscapes that have less and less resemblance to the natural landscape of the region in which they occur. At the same time, the designed landscape of one region tends to resemble more and more the designed landscapes of other regions.

Aesthetically, the prevailing contemporary-designed landscape tends to be ordered, with smooth green lawns interspersed by predominantly dense and dark green shrubs planted as hedges or in masses and symmetrically shaped trees planted either as individual specimens or in rows or groups composed of individuals of the same size and species. The only visible changes that are noticeable in this landscape are changing foliage colors of some of the trees and the changing displays of bulbs and annuals.

Natural Alternatives

In contrast to the relatively predictable, orderly and static landscapes that are products of typical planting design, there is a wide range of landscape possibilities that incorporate plant species native to the region and the microhabitat type in which they are planted. We might portray these potential approaches on a continuum that increasingly departs from standard landscape design practices and progressively incorporates natural processes as well as native materials. Following are steps along that continuum, indicating approaches that might be followed in different contexts by a landscape architect.

Substitution of native species of trees, shrubs and vines for the more commonly used mix of natives, exotics and cultivars represents a first step in the continuum. For example, this might suggest using a native *Viburnum* species in place of the exotic *Photinia* species in a shrub group, or a native *Amelanchier* species in place of an Oriental cherry. With this approach, plant selection has been modified, but placement is similar to that in a conventional design. There is a tendency to have greater continuity with the surrounding natural landscape of the region because of the repetition of similar species. Furthermore, if the plants are placed in appropriate microhabitats, there is less need for supplemental watering, feeding and protection from temperature extremes than there would be for many of the introduced species.

The next step along the continuum might be the introduction of a diverse mix of native ground-layer species in appropriate microhabitats, replacing the mulch beds and monotypic ground cover and annual flower beds that are so abundantly used in standard landscape design today. The forms of mulch or ground-cover beds might remain very much the same, but the species makeup would change. For example, in a shaded area English ivy might be replaced by a mix of ferns and woodland wildflowers; in a sunny flower bed, a mix of native meadow or prairie perennials might replace the sequence of spring bulbs, summer annuals and fall chrysanthemums. Finally, the exotic irrigation-requiring lawn might be replaced by a native sod former, such as *Buchloe dactyloides* (buffalo grass) in some of the Great Plains states. Again, even though the design form may not differ significantly from that in conventional contemporary landscape design, the ground-layer planting, like the trees and shrubs in the scenario discussed previously, will bear some relation to the region's natural landscape and should result in reduced input of water, fertilizer and specialized management and maintenance procedures.

A third level of complexity in the continuum of natural alternatives is the utilization of communitylike groupings of native vegetation as design elements. At this point along the continuum, both the selection and placement of plants are related to the species composition and distribution patterns that occur in the natural landscape. Following this approach, in the portions of a designed landscape where three-dimensional mass and enclosure are among the design objectives, one might initiate a planting that will emulate the natural forest for the region and the specific habitat type, utilizing the most characteristic canopy, middle-story, and ground-layer species of that forest type in the planting. Because such plantings would rarely be equivalent in size or extent to the natural stands of that forest type, the species array in the planting might similarly be scaled down. But the key species, the plant density, and distribution patterns would ideally capture the essence of the natural model over time. Similarly, in meadowlike or prairielike plantings in sunny areas, the composition would ideally incorporate the visually important species, the characteristic grass, forb ration and distribution patterns in a naturally evolved meadow or prairie. The stylized, abstracted plant community groupings included in this approach might be used as borders and islands adjacent to mowed lawns in some contexts. Hence, this approach is not a total re-creation of nature.

Ecosystem restoration, with a reintroduction of a full array of native species and reinitiation of natural processes on sites that have been adversely affected by earlier human activity, represents the most complex end of the continuum. Initially such work may require the reversal of some effects of this earlier activity; e.g., eradication of exotic and aggressive plant species or rebuilding of an organic soil where it has been removed. Next, propagules of an appropriate mix of species need to be reintroduced, sometimes over a period of years, and the restoration is managed in methods emulating natural processes.

Asclepias tuberosa *(butterfly weed)*

Learning From Natural Models

Even using the most elementary approach to landscape design with native vegetation, the designer needs to know something about the local natural landscape. For example, in the approach described as the substitution model, with native species of trees and shrubs placed in a traditional design form, the designer needs to know what is native locally. Although certain information can be learned from the literature, there is no satisfactory substitute for carefully observing the naturally occurring native plant communities of a region, if there are any preserved remnants.

Examples of information that can be obtained through such observation may include the following:

Species composition. One can sometimes obtain lists of native plants for a particular geographic area, but they only become meaningful to the designer when those plants are seen in their community groupings. Even identification becomes easier when one observes a particular plant repeatedly in similar environments. Even if it is unrealistic to expect to learn all the plant species in a community type, it is possible to learn dominant species, such as the major canopy trees in a forest community; prevalent species, which are those that occur with the greatest frequency; and visual essence species, those which may be important because of a distinctive aesthetic attribute (Morrison and Howell, 1983).

Distribution patterns. The distribution pattern of a particular species, as it occurs in nature, provides a very logical basis for placement of the same species in a designed landscape. Two aspects of distribution are particularly useful to observe: the distribution of a species relative to micro-environmental conditions and the degree of aggregation that is exhibited by the species.

One can learn through field observation which species have very narrow environmental amplitude (e.g., occurring only in very hot, dry situations or only in full sun) versus those which have a wide range of moisture or sunlight tolerance.

Besides these distribution tendencies, most plants exhibit a characteristic degree of aggregation. Plants are usually considered to exhibit one of the following three types of distribution: regular, random or aggregated (Curtis, 1959). Of these, it has been my observation that some degree of aggregation is the most frequently occurring pattern. The aggregation may be loose, as in the case of *Fagus grandifolia* (American beech) in the Midwestern beech-maple forest, or it may be much more highly aggregated, with many closely spaced individuals, as with *Betula nigra* (river birch) in the riverine forest of the same region.

Differing degrees of aggregation become particularly important in creating visible patterns in open prairie and marsh communities, where species that spread vegetatively typically form dense aggregations that feather out at the edge.

This phenomenon of having greater density toward the center of a group and more widely spaced individuals at the edges might be termed the drifting of a species.

Aesthetic characteristics. The aesthetics of naturally evolving plant communities are also best observed in extant stands of those communities. Among the noteworthy aesthetic attributes of naturally evolving landscapes that might be incorporated into designed ones are: spatial configuration, clumping and drifting of species, softness of edges and transitional zones, and diversity of colors and textures.

A recurrent theme in natural landscapes is the flowing space, an open space that bends out of sight and tends to have a degree of mystery. This characteristic is most obvious when it is embodied in a flowing river that curves, but it may also occur as an open space in an upland site.

Clumps and directional drifts of plants are common phenomena in naturally evolving landscapes. Clumps occur particularly with vegetatively reproducing shrubs and herbaceous plants which spread outward from a central nucleus. Typically, plants at the edges of shrub groups that spread in this manner are progressively shorter than those in the center, providing a rounding horizon. Drifts of one species often feather out and merge with a second or third species.

Edges between different species groups, then, tend to be indistinct. Where one community type meets another, there is frequently interpenetration, as where an oak-hickory forest meets a prairie in the Midwest.

The colors and textures of natural landscapes are often more subtle and more diverse than those of the standard designed landscape. Flowers in nature usually do not occur in the solid masses that tulips or geraniums occupy in the designed landscape. Except in a few cases, there are usually several species occurring together in nature, as in a prairie, where the bold colors of the forbs' flowers are filtered and made more subtle by the linear leaves of grasses. There are typically more seasonal changes of color in the natural landscape than in the traditionally designed one. Instead of the consistently green color of the designed landscape with its lawns and evergreen ground covers and shrubs, there are grasses that become dormant, subtle flower and seed head colors, and deciduous shrubs that change color and then lose their leaves. Texturally, the natural landscape exhibits greater variety than many designed landscapes because of the fine textures of ferns, grasses, hedges and rushes, and the bare twigs of deciduous shrubs, sometimes occurring as clumps or thickets.

Community dynamics. One of the most important lessons that can be learned from observation of natural landscapes is that they are always changing. There are often long-term successional changes occurring almost imperceptibly but also short-term changes resulting from phenomena such as an individual tree falling in the forest, an animal building a mound of fresh soil outside its burrow, or water changing levels in a marsh. Each of these phenomena provides information we need to know in designing and managing landscapes that display the forms and processes of natural landscapes.

Conclusion

In this article, I've tried to compare standard approaches to planting design with a series of alternative approaches and also to suggest that the best classroom for learning how to design with native plants and plant communities is the natural landscape itself.

The design, installation and management of naturally based landscapes holds great potential to provide a greater variety of designed landscapes, landscapes that are resource-conserving and that perpetuate regional differences. To be successful, it is essential that their designers understand not only artistic principles but also natural forms and processes. In the end, the ecological design may also be the most artful. ✿

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Phlox stolonifera, *woodland phlox, is an excellent candidate for ground cover. It has neat evergreen foliage just a few inches high, spreads by underground runners and bears a profusion of flowers in May which are typically a soft blue.*

Great American Small Flowering Trees: Ten Alternatives to Bradford Pears

Bob Hyland

Trees between 20 and 40 feet in height with colorful flowers, fruit, bark and autumn foliage are in demand. Exotic species from the Orient such as magnolias, flowering cherries, crabapples and Bradford pears have been popular for decades.

There are choice ornamental trees with multiseason interest that are native to North America and rival their foreign relatives. The following 10 represent such worthy garden plants.

Amelanchier arborea (downy serviceberry) Several species of *Amelanchier* are confused in the nursery trade. Most are multistemmed shrubs, but *A. arborea*, native from Canada to Florida, Minnesota, Oklahoma and Louisiana, grows into a tree 20-25 feet tall. It flowers for a short time (5-7 days) in mid- to late-April, but the pendulous clusters of white flowers are quite showy. Their weak fragrance is unpleasant to some.

A bonus for gardeners (and birds) are the edible fruits that ripen from green to red and finally purplish-black by June. The fruits are the size of miniature blueberries, but are not on the tree long enough to be ornamental.

Young leaves are covered with gray, downy fuzz when they first unfurl in the spring, but the hairiness disappears as the leaves reach full size. The foilage turns dramatic shades of yellow, orange, and deep red in autumn, mak-

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***Bob Hyland** was visitor education specialist at Longwood Gardens, Kennett Square, PA for seven years. During that time, he taught courses on small flowering trees. He has masters degrees in ornamental horticulture from North Carolina State University and the University of Delaware. He is now a horticulturist in the San Francisco Bay area.*

Photo by Claire E. Sawyers

Eastern redbud, Cercis canadensis, *blooms in spring with clusters of tiny rosy-pink flowers. This small tree has heart-shaped leaves which turn clear yellow in autumn.*

Sourwood, Oxydendrum arboreum, *is a tree of all seasons but most dramatic in the fall when its three- to eight-inch-long leaves turn brilliant red and purple depending upon weather conditions and siting.*

ing downy serviceberry one of the finest native trees for fall color. Vertical ridges and furrows of light and dark gray on the bark provide some winter interest.

Downy serviceberry is rarely used as a specimen tree and is, perhaps, more suitable in informal groupings in a lawn or mixed tree and shrub planting.

Hardy in Zones 4-9, tolerant of a wide range of soils and easy to cultivate, downy serviceberry is, unfortunately, prone to leaf rusts, powdery mildew, Japanese beetles, mites and aphids. An integrated program of sprays and good culture should yield healthy, attractive trees.

Asimina triloba (pawpaw)

Our native pawpaw is a small tree with unusual flowers and large leaves that have a tropical appearance. It generally grows as a multistemmed understory tree in woodlands from New York to Florida and west to Nebraska and Texas. When cultivated as a single-trunked tree, pawpaw merits attention for many gardens.

Pawpaw reaches 15-20 feet in height and naturally assumes a pyramidal shape when grown in full sun. Waxy, purple flowers in May often go unnoticed as the tree begins to leaf out. They are worth close inspection for their bizarre color and shape and they show off best in the small garden.

Coarse, 6- to 12-inch-long leaves turn an excellent yellow in autumn. They obscure small, edible, greenish yellow fruits that ripen to brown as they fall. The bananalike taste appeals to some people, and selections are being chosen for larger fruit and more distinctive taste.

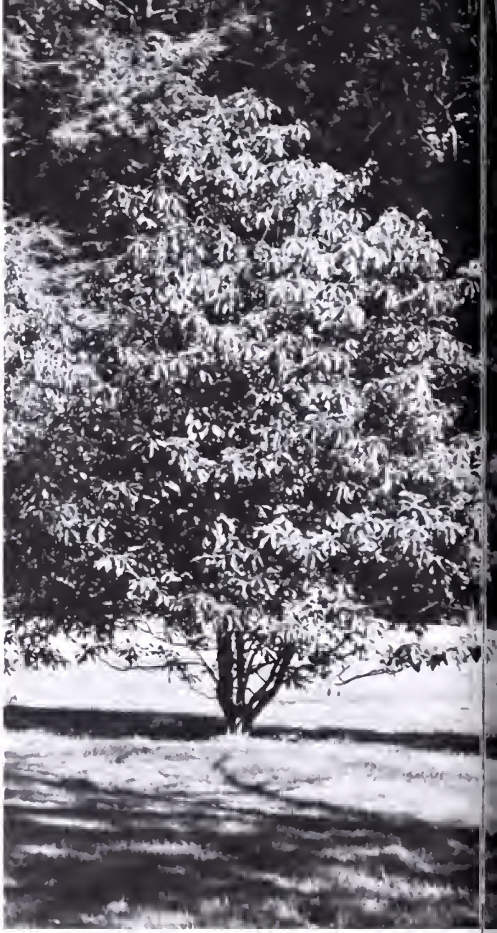
A. triloba is hardy in Zones 5-8. It is ideal planted alone or in small groups. Native summer and fall-blooming perennials like New England aster (*Aster novae-angliae*), Michaelmas daisy (*Aster* cv.), goldenrods (*Solidago* spp.), ironweed (*Vernonia noveboracensis*) and Joe-Pye weed (*Eupatorium fistulosum*) make good companion plants. I have also seen a grove of pawpaws used effectively to define the edge of a parking lot at the Scott Arboretum on the Swarthmore College campus in Pennsylvania.

Trees prefer moist, fertile, slightly acid soils. They are difficult to transplant from the wild and should be purchased as balled-and-burlapped or container-grown stock. A word of caution! Pawpaws sucker from underground roots, but unwanted suckers are easily eliminated with a sharp spade or pruning shears.

Cercis canadensis (Eastern redbud)

Clusters of diminutive, rosy-pink flowers, heart-shaped leaves, and clear yellow autumn color characterize this small tree, hardy in Zones 5-9. It is an understory tree in woodlands from New Jersey to Florida, New Mexico and Texas. Taking a cue from its native habitat, plant redbuds in partial shade and either acid or alkaline, well-drained soils. Avoid lawnmower damage and improper pruning cuts which can provide entrance points for fungal organisms that cause cankers, a leading cause of branch dieback and plant death among redbuds.

The garden value of this tree is its lovely flowering in mid- to late-April. Tiny blossoms that have the characteristic form of other plants in the Pea Family (garden beans and peas) are reddish-purple in bud and open to a lighter pink. Pealike pods, two to three inches long, develop after flowering and ripen from green to papery brown. Pods are more visible during the leafless dormant season, but have limited ornamental appeal.



Franklinia, Franklinia alatamaha, *is a spectacular tree for some gardens. It rarely exceeds 20-25 feet in height and its multiple trunks spread about 20 feet.*

Redbuds usually develop into multiple-stemmed, spreading, flat-topped trees that branch close to the ground. Judicious pruning at an early age can easily create a single-trunked specimen for patios and outdoor areas. Underplantings of Siberian squills (*Scilla sibirica*)*, lungworts (*Pulmonaria* spp.)*, moss pinks (*Phlox subulata* cultivars), or periwinkle (*Vinca minor*)* give nice effects.

A white-flowered form (*C. canadensis alba*) is sometimes observed in nature and is available from some nurseries. There are a few other native redbud species that are more suitable for other regions of the country. *C. reniformis* is native to Texas and New Mexico and has thicker leaves and deep pink flowers. California or western redbud (*C. occidentalis*) is native to California, Utah and Arizona. Its leaves are bright green and differ slightly in shape and size from its eastern relative. The purplish-pink blooms are also slightly larger.

Chionanthus virginicus (fringe tree)
Native from New Jersey south to Florida and west along the Gulf Coast to Texas, the fringe tree is an aristocrat in the garden. The plant is a multistemmed, shrubby tree with sparse branching. A mature specimen is 15-20 feet in height with an equal landscape spread.

Fringe tree shows little sign of life until mid- to late-spring. Then drooping, white-flower clusters emerge at the same time as new leaves and quickly cover trees with a haze of white fringe. On a gray, overcast day a fringe tree can shimmer in the landscape.

Trees have male or female flowers but not both. Male flowers are larger in size and the dense clusters are slightly more showy than the bloom on female trees. However, choose females if you are interested in the small, bluish-black fruits shaped like small olives. They are attractive for several weeks in early fall. Otherwise, yellow leaf color is the only autumnal reward.

Give fringe trees fertile, acid soils that are on the moist side. They will grow either in full sun or partial shade and are effectively used in small groups in an open lawn or as specimens in a mixed herbaceous border.

In the mid-Atlantic and northeast regions, bloom time corresponds with tall bearded (*Iris* cv.)* and Siberian irises (*I. siberica*)* and field poppies (*Papaver rhoeas*)*. The most dramatic tree I have seen is planted over a patio and studio garden near Wilmington, Delaware. Its springtime flowering and excellent summer shade are unbeatable.

Cornus alternifolia (pagoda dogwood)
The landscape value of pagoda dogwood is its distinctive architectural form. Branches spread horizontally in tiers, suggestive of an oriental pagoda. It grows in the wild from Canada south to Georgia and Alabama and west to Minnesota and is hardy in Zones 3-7.

Flat-topped clusters of white flowers bloom in the spring from mid- to late-May and are somewhat malodorous. They are succeeded by blue-black, berrylike fruits held on pinkish-red stems. While colorful for awhile, the fruits are not long lasting.

C. alternifolia is a worthy substitute for its native relative, the eastern flowering dogwood (*C. florida*). Its showy white spring bracts, colorful red fruits, burgundy-red autumn foliage, pebbly bark texture, and easy propagation have made the eastern flowering dogwood one of the most handsome and popular small trees in North America. However, many have been killed by anthracnose, a fungal disease that first spots foliage and, if left unchecked, invades and kills stems, branches and entire trees.

Crataegus viridis (green hawthorn)
Green hawthorn, native from Virginia to Florida and west to Illinois, Missouri, and Texas, derives its common name from the greenish gray of its bark. Yet there are other reasons why this tree deserves more use in gardens.

It is outstanding for its heavy fruiting, rivaling many of the more popular crabapples. Clusters of reddish-orange fruits (each about one-quarter inch in diameter) ripen between September and October. The persistent fruits retain this bright color into the coldest winter months of January and February. A tree showing off its red fruits against a fresh blanket of snow is a sight to behold!

This 20- to 35-foot hawthorn develops a spreading, vase-shaped branching pattern. Stems and branches contain sharp, $1\frac{1}{2}$-inch-long thorns, a drawback to some gardeners.

Flowering comes in mid- to late-May and lasts seven to ten days. White flowers with five petals are borne in two-inch-wide clusters and exude an unpleasant scent.

C. viridis is hardy in Zones 5-9 and is easy to grow in full sun and most soil types. Its only problems are susceptibility to rusts that can spot and discolor leaves and fruits and, perhaps, a tendency to develop weak crotches and narrow branch angles that lead to splitting and structural damage on older trees.

A selection, *C. viridis* 'Winter King', is available and offers larger, deep red fruits. It and the species are among the best native trees for winter landscapes and gardens.

Franklinia alatamaha (franklinia)

If for no other reason, grow as a conversation starter. It was collected along the banks of the Altamaha River in Georgia in 1770 by John Bartram, but has never been seen in the wild since 1790. Supposedly, all plants available today are derived from Bartram's original collection.

More than a botanical curiosity, franklinia is a spectacular tree for some gardens and hardy in Zones 6-8. It rarely exceeds 20-25 feet in height and its multiple trunks spread to about 20 feet.

The real appeal of this tree is its late summer and fall bloom, generally early August in the mid-Atlantic and northeast regions. The cup-shaped, white petals enclose a distinctive cluster of yellow stamens and exude a faint fragrance. The flowers do not bloom all at once, but open sporadically from early August through September. Bloom may continue even after the shiny, dark green, 5- to 6-inch-long leaves have colored shades of orange, burgundy and scarlet in October.

Other ornamental features of franklinia are the hard, round, nutlike fruits that cling to branches after leaf drop. Smooth gray bark broken with lighter vertical fissures offers additional winter interest.

Franklinias thrive in moist, acid, well-drained soils suggestive of their lost, native coastal plain habitat. They develop sparse, fibrous root systems and are better purchased as small, container-grown plants. Larger balled-and-burlapped trees are not easily transplanted into the garden.

To take full advantage of its summer flowering, combine franklinia with late-blooming ground covers, such as white lilyturf (*Liriope muscari* 'Monroe White')* or the striking blue autumn leadwort (*Ceratostigma plumbaginoides*)*. A variegated carpet bugleweed (*Ajuga reptans* 'Burgundy Glow'), or late-blooming hosta (*Hosta* 'Ginko Craig' or *H. plantaginea*)* are other possible landscape combinations.

Halesia tetraptera (Carolina silverbell)
(incorrectly listed as *H. carolina*)

The diminutive, bell-shaped flowers of this small native tree are ephemeral but exquisite in the spring garden. It is seldom planted and deserves more attention.

The half inch, white bells develop in small clusters on year-old wood for one week in late April or early May. Suspended below branches, the flowers are best appreciated looking up into the tree canopy from underneath. A dark green background of conifers also accentuates the flowers when viewed from a distance.

Carolina silverbell is native to the East Coast from West Virginia to Florida and eastern Texas, and is hardy in Zones 5-8. Low, spreading branches form a broad, round crown. Mature landscape height is 30 to 40 feet, but the growth rate is no more than one foot per year.

Other ornamental attributes of this tree are its yellow fall leaves, papery brown four-winged fruits visible in fall and early winter, and ridged and furrowed bark alternating from light gray to brownish-black.

Silverbells transplant easily and prefer organic, acid soils. Full sun is best for flowering, but trees will tolerate partial shade. Carolina silverbell is a beautiful patio tree where its branches can spread horizontally and create an informal canopy. Pruning of lower branches will elevate the tree to a comfortable height for human activity below. Azaleas, rhododendrons and other broad-leaved evergreens are good companion plants for underplanting. A ground cover of the native foamflower (*Tiarella cordifolia*) that blooms at the same time is one of the nicest plant combinations I have seen.

Magnolia virginiana (sweet-bay)
Sweet-bay offers one of the most subtle, sweet, lemony-fresh fragrances among garden plants. Unlike its Oriental magnolia relatives that boast large flowers all at once in early spring, sweet-bay allows the competition to pass before blooming. The creamy white flowers with nine to twelve petals open over a four to six week period from late May to early July. Since the flowers are not produced in great abundance, they do not make a color statement when viewed from a distance. The cone-like fruits that split open to reveal bright red seeds in August are more distinctive.

In northern areas (Zones 5-7), *M. virginiana* forms a small, multistemmed, deciduous tree not more than 20 feet tall. In southern regions (Zones 8-9) sweet-bays are semievergreen to evergreen and form larger, pyramidal trees. Varieties of sweet-bay with better form and semievergreen foliage are being selected and tested for hardiness in northern climates.

Sweet-bay is an excellent tree for small patios, decks and open-air porches. Site a specimen near an open window to take full advantage of the sweet aroma that wafts lazily on summer breezes. The handsome, dark green leaves also provide interest when the wind buffets and exposes their silvery undersides. Unfortunately, the foliage provides no autumn color.

Sweet-bays tolerate wet soils, shade and acid soils. The shallow root systems develop near the soil surface and should be mulched to keep them cool and moist and to prevent disturbance from cultivation. Vigorous new stems occasionally grow at the base of sweet-bays, but are easily pruned out.

Oxydendrum arboreum (sourwood)
Sourwood is truly a tree for all seasons in home gardens in Zones 6-9. Michael Dirr in his *Manual of Woody Landscape Plants* says that "many gardeners feel, among native trees, this is second only to flowering dogwood" (*Cornus florida*). I think it is equal to or better than flowering dogwood.

Its habitat extends from Pennsylvania to Florida, and west to Indiana and Louisiana. The tree naturally develops a pyramidal shape with drooping branches. It slowly grows to a maximum height of 30 feet in gardens and has a spread of 15 to 20 feet. A good plant for summertime bloom, sourwood sports drooping sprays of white flowers that cover a tree in a lacy veil from late June to early July after leaves are fully developed. The tiny, individual urn-shaped blooms are reminiscent of lilies-of-the-valley.

During the remainder of the summer, flowers give way to yellowish-green fruiting capsules that gradually fade to brown. October may be the most dramatic time for sourwood when the lustrous dark green, three- to eight-inch-long leaves turn brilliant red and purple depending on weather conditions and siting. The sprays of tan fruits are dramatically accented by the vibrant foliage and provide winter interest after leaf drop.

Sourwoods are best transplanted as young trees. They demand acid soils (pH 5.5), perfect drainage and organic soils. A full sun exposure will ensure the best flowering and fall color. Heavy clay soils with poor drainage, drought and high pH lead to weak trees that never develop beautiful form or size.

Summer and fall-blooming perennials such as New England asters (*Aster novae-angliae*), daylily cultivars (*Hemerocallis*)*, black-eyed Susans (*Rudbeckia hirta*), and fall-blooming sunflowers (*Helianthus* x *multiflorus* 'Flore-Pleno') are potential combinations. Ornamental grasses are also ideal companions to sourwoods, especially variegated miscanthus (*Miscanthus sinensis* 'Variegatus')* and feather reed grass (*Calamagrostis acutiflora* 'Stricta')*.

Many of these native trees are available from local nurseries and mail-order companies. Check catalogs and ask your local garden center or nursery to order plants. These trees, while selected for small gardens, are ideal for all size gardens and will reward you with years of beauty.

* *Editor's Note: These plants are not U.S. natives.*

Great American Shrubs

Harrison L. Flint

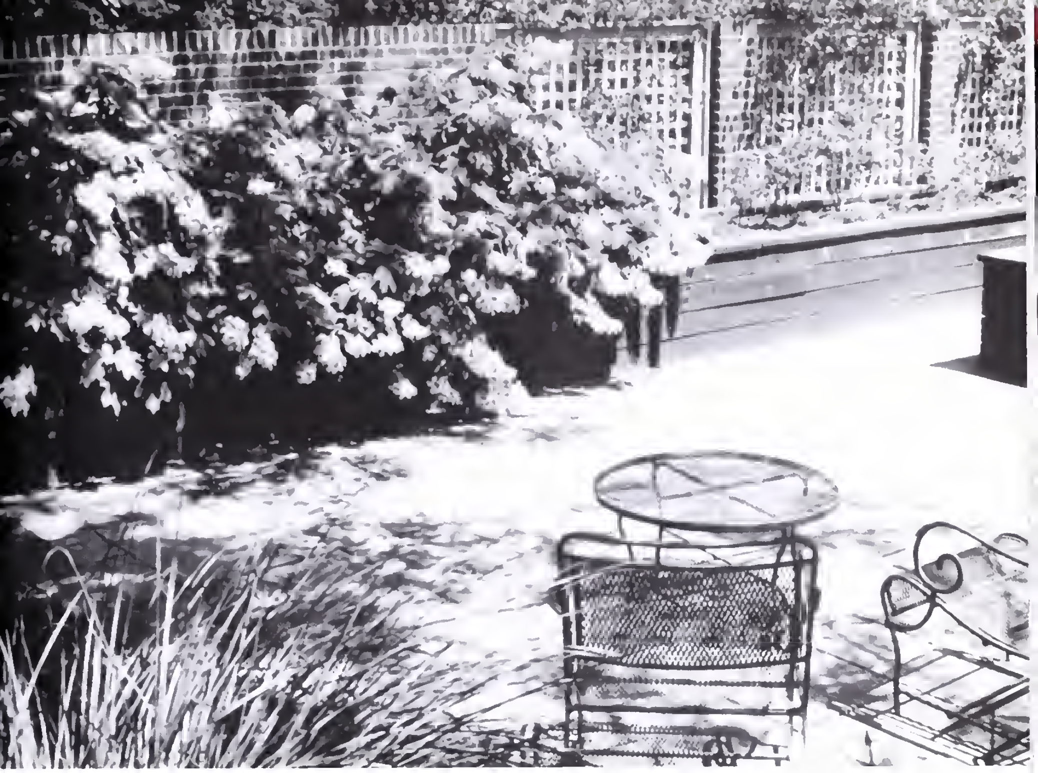
Temperate zone North American shrubs can be divided into two groups: those we use well in the landscape and those we don't. Over a third of our "standard" landscape shrubs have their origins somewhere in North America, the others originating from some other part of the world or from hybridization, accidental or deliberate. If we consider the richness of the woody flora of North America, we have to conclude that we are not using this reservoir of plants very well. That is the problem, and the opportunity, we face.

The shrubs that follow form a partial list of great natives that, in my opinion, are not used often enough, nor well enough, and the accompanying comments suggest ways of improving the situation. This list, arranged alphabetically by scientific name could be expanded greatly, given sufficient time and space, but let this sample serve as a start. Any native plant enthusiast can do the expanding, and no doubt each person's list will be unique.

Aesculus parviflora (bottlebrush buckeye) is a great shrub for large-scale situations, with its pleasingly coarse foliage and solid visual mass. Add to that the spectacular flowering interest in midsummer, and it is hard to believe this plant is not used more often. Even the winter aspect of the plant is interesting, because of the tiered branching and upright, leftover flower stalks. Bottlebrush buckeye grows slowly when young and can be contained by pruning and digging-out sucker shoots in small-scale plantings, but it is most troublefree, and perhaps most appropriately used, when massed in large plantings.

Arctostaphylos uva-ursi (bearberry) is an extremely hardy shrub when well established, and establishment is usually not difficult if a few preparations are made. First, start with pot-grown plants that are not excessively potbound. Amend the soil as necessary to ensure it is well drained. Extra watering may be necessary for establishment, but keeping the soil waterlogged can kill bearberry plants quickly. During the first year after planting, avoid any fertilization of the soil other than super- or treble-phosphate in the planting mix, and powdered sulphur if the soil reaction (pH) is initially above 5.5 or so. It is not absolutely clear that this plant needs such acidic soil, but since it is a member of the Heath Family (Ericaceae), acidification is at least a good "hedge". When established in the right soil, this plant grows so vigorously that it will need to be contained in small-scale situations.

Cornus amomum (silky dogwood) is one of several species of more or less red-twigged shrubby dogwoods, including *Cornus sericea* (red-osier dogwood), another North American native. Silky dogwood is a little less cold-hardy than red-osier dogwood, and more adaptable to southern landscapes (to Zone 9a). Its twigs are not as bright red as those of red-osier dogwood in late winter, but its fruits ripen a beautiful blue in late summer or early autumn. It is equally useful for naturalized landscapes or as a visual screen in informal



Oakleaf hydrangea, Hydrangea quercifolia, *is not fully top-hardy in zones 5b to 6b, but is still useful as a border shrub or in masses. Erect clusters of white flowers appear in spring.*

landscapes. The name silky dogwood refers to the fine silky pubescence on twig tips and underneath young leaves, and it can be distinguished from red-osier dogwood at any season by its brown, rather than white, pith.

Dirca palustris (leatherwood), native to northern swamps, is seldom used as a landscape plant, yet offers unique seasonal interest, in addition to its tolerance of poorly drained and calcareous soils. A slow grower, this shrub can be counted on to remain below eye level for many years, retaining its compact shape without pruning. Small, tubular, pale yellow flowers open in early spring, shortly before the leaves start to unfold, and so are noticeable at close range. Leaves emerge pale green, changing to medium green as they expand fully to become elliptical and two to three inches long. Stems are extremely pliable, giving the name "leatherwood", and have much the same appearance in winter as those of the deciduous daphnes, which are closely related.

Fothergilla species (fothergillas) have received increasing attention in recent years, but still are not as widely used as would be expected from their garden and landscape assets. These shrubs are prime contenders for attention in the landscape in two seasons. In midspring, their upright bottlebrush-shaped clusters of creamy white flowers add delightful color during leaf unfolding—color that combines well with just about any other color. Yet autumn is this shrub's showiest season, as the neat, soft green, witch-hazellike leaves turn to brilliant gold overlaid with scarlet in "good" years, and soft gold to orange in quieter times. Dwarf fothergilla *(F. gardenii)* usually remains below three feet in height, slightly exceeding this eventually in shade, and has small flower clusters (just over an inch long), which become colorful before much leaf expansion has occurred. Flower clusters of large fothergilla *(F. major)* open a little later and are two to three inches long, in proportion to overall plant size. Large fothergilla is a magnificent shrub, useful for naturalizing, screening (but not quickly), or simply included in mixed shrub plantings for its distinctive landscape interest.

Hydrangea quercifolia (oakleaf hydrangea), native from northern Alabama, Georgia, and Mississippi, to Florida, is surprisingly useful in the North as well. Even though it is not fully top-hardy in Zones 5b to 6b, it is still useful there as a massing or border shrub below eye level. In Zones 5 and 6 its flower buds survive mild winters. Even when the tops are winterkilled to the ground, the hardy rootstock sends up new shoots rapidly in the spring, forming a three-foot mound of foliage by late summer. The coarsely handsome leaves turn russet-red by midautumn. In the more southern areas where it is native, oakleaf hydrangea makes a shrub six to eight feet tall, and even broader, with the added appeal of great erect clusters of white flowers in spring.

Hypericum species (St. John's-worts) of shrubs reliably remain below three feet in height without pruning, thrive in full sun, tolerate considerable dryness, and make an impressive show of golden yellow flowers in midsummer. Three North American species: *H. frondosum* (golden St. John's-wort), *H. kalmianum* (Kalm St. John's-wort), and *H. prolificum* (shrubby St. John's-wort) are pretty much interchangeable in gardens and landscapes in Zones 5–9, and Kalm and shrubby St. John's-worts are useful northward at least to Zone 4b. Kalm St. John's-wort is the northernmost in origin, native from Quebec to Michigan. It has narrow leaves, only one to two inches long, and usually grows only two to three feet tall, with flowers less than an inch across. Shrubby St. John's-wort, native from New Jersey to Georgia, is slightly larger in all respects, growing to three feet tall. Golden St. John's-wort, native from the Carolinas to Texas, has blue-green leaves up to three inches long, and flowers close to two inches across. The popular selection, *H. frondosum* 'Sunburst', has performed very well for ten years at Purdue University (Zone 5b), including two extremely difficult winters (1983 and 1985), and has produced a good show of red-orange autumn foliage in most of those years.

Ilex glabra (inkberry) is native along the Atlantic and Gulf coastal plains from the Canadian Maritimes to Texas. With such a great natural range, it would be surprising if plants did not vary widely in cold hardiness, and perhaps heat tolerance as well. Forms adapted to extreme southern and northern climates may have been selected, but if so are not generally known about, and landscape use of this species is most common in the Mid-Atlantic region. This is a handsome evergreen growing eight to ten feet tall in good soil, but amenable to pruning for size control where necessary. A better solution, though, is to use one of the slower-growing cultivars such as 'Compacta', 'Densa', or 'Nordic', which may become tall eventually but will remain much lower for years. Leaves of inkberry are only an inch or two long, flat and lustrous, producing a "flatter" surface appearance than those of the Japanese holly *(Ilex crenata)* cultivars. Like all hollies, this one is dioecious, but since its black fruits add much less landscape interest that those of the red-fruited species, it makes no difference, in many applications, whether male or female plants are used. The selection 'Ivory Queen', however, has ivory-white fruits, with special winter interest, so the presence of a male plant in its vicinity for pollination becomes important.

Myrica pensylvanica (bayberry) must have been one of the first sights the Pilgrims saw as they landed at Plymouth, since this shrub is so common on the North Atlantic seacoast from Nova Scotia to Maryland. Deciduous in the North and grading to at least semi-evergreen farther south, with two-inch leaves that are pleasantly aromatic when crushed, this handsome shrub is most useful as a massing plant, to be kept below eye level, when necessary, by pruning every five years or so. It can also be used as a specimen for accent or as a component of mixed-shrub plantings, for its unique foliage and fruiting interest. Female plants bear clusters of white-gray waxy fruits, which hang on the plant long after leaf-drop, and sometimes almost until spring. The heavy coating of wax that covers these fruits was extracted by boiling and used in candlemaking by early settlers, and this practice is still being carried out for the benefit of tourists who appreciate the bayberry aroma released as bayberry candles burn. Bayberry can convert atmospheric nitrogen to usable forms with the help of soil microorganisms, so it thrives in infertile soil, but it also grows well in the heavier, more fertile soils of most of the Midwest. As would be expected from its native habitat, it is unusually salt-tolerant, and tolerates dry soil as well, making it one of the most useful and troublefree North American shrubs, adaptable in Zones 5–9.

Oemleria cerasiformis (Indian plum, formerly *Osmaronia*), is native to the coastal Pacific Northwest, and probably has its greatest landscape value there, although it might well be tried more fully in other regions. In *Gardening with Native Plants of the Pacific Northwest* (University of Washington Press, 1982), Arthur Kruckeberg points out that no other native shrub of the region "better celebrates the spring rebirth of our lowland landscapes." This shrub's small hanging clusters of white flowers, soon joined by the emerging pale green leaves, "light up the leafless woods" for several weeks in their native climate. Its half-inch fruits are interesting at close range, colorful in their yellow-orange stage in early summer, and interesting as they ripen deep purple in late summer.

Pieris floribunda (mountain andromeda) is one of the hardiest and most beautiful of all broad-leaved evergreens. It is native to the mountains of the southeastern United States but adapted in landscape usage to much of the northeastern U.S. as well, and even the Midwest in sites having acidic, organic soils and protection from wind and full sun in winter. This is a lower, more moundlike plant than its more popular Japanese relative, *Pieris japonica*, and it seldom grows above eye level except in very shaded sites. It flowers a little later than Japanese andromeda, holding its flower clusters more erect, and its uniformly dark green, slightly rugose foliage offers pleasing texture. Most important of all for residents of northern areas is its winter hardiness, to Zone 5a, assuming good site selection and soil that is acidic (below pH 5.5) and well drained, but not excessively dry.

Rhododendron canescens (Piedmont azalea), native from North Carolina to Florida and Texas, is the most spectacular of the pinxterbloom-type azaleas. It produces masses of fragrant white flowers with pink tubes opening in early spring, before and along with the new foliage. Its useful range extends northward at least into Zone 6b in the East. In more northern areas where it is not hardy it can be replaced by the equally fragrant roseshell azalea *(R. prinophyllum)* or the pinxterbloom *(R. periclymenoides)*, which typically lacks fragrance. Where it is well adapted, though, Piedmont azalea is a clear first choice in this group.

Rhododendron vaseyi (pinkshell azalea) is one of the most distinctive of all azaleas. It is a native of North Carolina growing to ten feet tall in good sites. This shrub has almost clear pink flowers in great numbers in midspring. Two other features give this shrub special value: it thrives in fairly wet soil and it has some of the best foliage character to be found in the deciduous azaleas. Use in place of the hybrid azaleas, especially in naturalized and informal landscapes.

Rhus ovata (sugarbush) is one of three entire-leaved sumacs from southern California—native to Arizona and Baja California as well. Sugarbush is a densely compact shrub growing from three or four feet tall and wide in desert sites to at least twice that size in semiarid climates. Its two- to three-inch leaves are evergreen, leathery and deep green with red margins when young, rounded with pointed tips. Clusters of small red dormant flower buds add interest at close range in winter, then open creamy white by late spring. Fuzzy red fruits develop, which in some years add color to female plants throughout the following winter. The lush green appearance of this shrub belies its tolerance of dry climates, and contrasts with its many silvery-gray companions on the desert. In spite of this lush look, sugarbush exhibits traits that suggest adaptation to dry climate: compact growth habit and thick, rounded leaves that cup downward, protecting the undersides of the leaves from wind. The closely related lemonade berry *(Rhus integrifolia)* differs only in minor ways, and is interchangeable in the dry southwestern landscapes where these shrubs are appropriately used.

Shepherdia rotundifolia (roundleaf buffaloberry), unlike the more common species of *S. argentea* and *S. canadensis,* is evergreen, although it would be more descriptive to say ever-silver, since that is its color year-round. This shrub grows to three feet, and forms a compact mound of foliage. Few shrubs better illustrate morphological adaptation to dry climates. This compactness of foliage, the small, round, thick leaves, cupped downward, the dense mat of hairs on the lower leaf surfaces, and the reflective quality of the silvery scales that give the foliage its striking color, all conserve water in the plant. This shrub is not widely planted as yet, even in its native region, and its adaptability to other regions is largely untested. In arid climates, it offers striking visual appeal, and its spiny twig tips should make it useful as a physical barrier that will remain low enough to see over.

Sophora secundiflora (Texas mountain laurel, mescal bean) is a tall evergreen shrub, sometimes to 25 feet and treelike. As a member of the Legume Family (Fabaceae) it is not at all closely related to the eastern mountain laurel *(Kalmia latifolia),* and of course neither plant belongs to the Laurel Family (Lauraceae). Mescal bean grows wild on limestone soils from central Texas to New Mexico and into Mexico, and is included in southwestern landscapes for its beautiful blue-violet flowers, borne in nodding clusters in early spring, as new foliage is unfolding. Their sweet fragrance is pleasant in minor amounts, but can be overwhelming for some people. The fuzzy brown constricted pods that follow are interesting, but add little to the plant's landscape value, and since the seeds are poisonous, some prefer to remove the pods before they mature. The dark green foliage, though, is an asset year-round. This shrub is perhaps best used as a specimen for accent, or to add early spring interest to mixed plantings. It is tall enough to serve as a visual screen, but not dense enough without frequent pruning.

Vaccinium parvifolium (red huckleberry) ranges widely as a native shrub in the coastal Pacific Northwest and on the lower western slopes of the Cascade Range and northern Sierra Nevada. Its flowers are barely noticeable, but the small bright red fruits that follow in early sumer add interest and are excellent in preserves and pies. The most significant landscape feature of this plant, though, is its foliage. The small, delicate leaves begin to unfold by midspring, and form lacy layers on the finely twigged branches. It retains its bright, pale green color throughout the unfolding process and for some time thereafter, eventually turning to soft green, but never the dark green of so many of its companion species found in the Pacific Northwest in late summer. Nothing brightens a Douglas-fir forest like this shrub, caught in a ray of light penetrating the dark woodland.

Viburnum rufidulum (southern black haw) is similar in many ways to the better known northern black haw *(Viburnum prunifolium).* It can be used as a large shrub or as a small patio tree. Both black haws are rather stiffly upright in their branching; both have excellent foliage with significant autumn color; and both become dense enough to make excellent hedges or informal visual screens. Southern black haw has more glossy, leathery foliage than its northern counterpart, and its fall foliage is magnificent—scarlet to mahogany leaves accentuated by highlights on the shiny leaves. Southern black haw is not as cold hardy as northern black haw, but plants have succeeded so far north of the native limits (southern Illinois to Virginia) that a cold-hardiness rating of Zone 6a seems conservative, and plants propagated from those of northern origin probably will withstand most Zone 5 winters.

Viburnum trilobum (American cranberry bush) is so similar to the more-often-planted European cranberry bush that some botanists have lumped them together as a sin-

Pinkshell azalea, Rhododendron vaseyi, *has clear pink flowers in great numbers. It has some of the best foliage character to be found in the deciduous azaleas and will thrive in fairly wet soil.*

gle species. Yet there are a few differences. First, for native plant purists, American cranberry bush is indeed native across the North American continent, in the northern United States and most of adjacent Canada. Foliage of American cranberry bush is much more likely to color well in autumn than that of European cranberry bush. Timing of color is related to timing of acclimation in most shrubs, and so reflects on relative hardiness. But in this case, the difference in hardiness between the American and European cranberry bushes is of great concern only if you happen to live where average annual minimum temperatures are in the range of 40 to 50° below zero. There, American cranberry bush clearly has the edge. Both cranberry bushes produce magnificent fruiting displays in autumn and well into winter, but the fruits of American cranberry bush are clearly preferred by makers of preserves.

All of these shrubs are functional landscape plants and all have distinctive visual character. They can be used in constructed landscapes in any appropriate sites within their native ranges, and many can be used far from home as well, since in virtually every case the useful range far exceeds the natural range. All can be used in traditionally designed landscapes or in restored plant communities, the ultimate in "natural landscaping" short of nature itself. The next step is to broaden this list for the region in which you live, and the ultimate challenge is to use your native shrubs well, whatever your design preference.

Striking Natives for the Perennial Border

Edith R. Eddleman

When the term "herbaceous perennial" is used, many plants which spring to mind are native American plants: purple coneflower, blazing-stars, black-eyed Susans, Stokes' aster, New England aster (to name a few), but as one horticultural wit aptly observed, we Americans often fail to notice the merits of our native plants until they have attended "finishing school" in English and European gardens. Sometimes easily propagated natives are not even available commercially in this country. For example, *Aster lateriflorus,*[1] native from southeast Canada and Minnesota south to Florida, Missouri and Texas, whose tiny, white, autumn flowers have long been appreciated in English gardens, has only recently become available to U.S. gardeners (ironically from stock imported from England and Germany). Perhaps the public is not entirely to blame for this lack of observance, for it is only in gardens where soil is prepared well, adequate water is supplied, plants are well-sited, and competi-

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Phlox pilosa ozarkana *is an 18-inch-tall phlox that bears fragrant clusters of white-eyed, mauve-pink flowers for a two-and-one-half-month period.*

ion is quelled that the full potential of our natives can be appreciated.

It is often said native plants perform better simply because they are native and, hence, "better adapted," ignoring the diversity of geographic and climatic conditions in this country. Being native does not necessarily ensure that a plant will be more tolerant of drought, poor soil conditions or inadequate ight. While knowledge of the plant's natural range and the conditions under which it grows gives a good indication of conditions which it can tolerate, this is not necessarily a complete indication of the plant's adaptability. An example of this is *Lobelia cardinalis.* Naturally occurring in wet areas of the central and eastern U.S., often in partially shaded sites, this plant can be grown beautifully in full sun and drier garden soils. Another example is *Penstemon smallii,* native to a narrow geographical range in the mountains of North Carolina and Tennessee. This Southerner is hardy at east as far north as Zone 5 (though its strict requirement for well-drained soil makes it short lived in the landscape). When thoughtfully chosen, native perennials often prove to be surprisingly adaptable and are beautiful in combination with each other and with "introduced" or exotic species.

Most important to designing a border is careful plant selection. The first question to ask is: Is the plant appropriate to the garden site and conditions? If, for example, you are faced with a soil which is constantly moist but exposed to the sun, then it is best to work with plants such as *Vernonia* spp., *Eupatorium* spp., *Hibiscus moscheutos, Aster novae-angliae, Aster novi-belgii, Lobelia cardinalis, Filipendula rubra, Boltonia* spp., and others which tolerate, but do not require, wet soils. Once plant-site compatibility is achieved, the design elements of form, texture and color should be considered.

The shapes of plants provide the perennial border with a profile or cross-sectional form. The leaves and flower-bearing stems of these plants give geometric structure to the garden. Perennials generally have either vertical or horizontal growth habits but, for the purposes of design, it is useful to characterize their shapes as spiky, rounded (or oval), or creeping ("weavers").

Perennials with spiky leaves or flowering stems provide a strong vertical element in the garden. The leaves of *Yucca filamentosa* are a good example. When in bloom the tiered stalk of white bell-like flowers adds increased punctuation to the upright clump of evergreen foliage. Likewise, the stems of *Veronicastrum virginicum* rise to heights up to five feet, clothed in whorled dark green leaves topped by multi-branched spires of small white flowers in mid summer. Other plants for vertical interest include the many species of *Liatris, Physostegia,* foliage of *Iris virginica* and many native grasses such as *Panicum virgatum.* Plants which offer vertical interest but whose flowers are not in spikes include *Filipendula rubra,* with fluffy, wide-spreading flower heads of tiny pink flowers borne on wiry stems above beautiful clumps of deep green foliage and *Eupatorium fistulosum* with imposing dome-shaped dusty-pink flower heads held 8–10 feet tall. *Baptisia* offers spikes of pea-shaped flowers in blue, white, cream or yellow (depending on the species) in mid- to late-spring; when out of flower, their large rounded clumps of foliage make a suitable background for other flowering perennials.

Other rounded forms are represented by *Amsonia, Boltonia asteroides,* many asters and *Euphorbia corollata* which, while rounded in form, also functions in the garden as a "weaver". Weavers are plants of creeping habit such as *Verbena canadensis* or plants with lax flowering stems such as *Campanula rotundifolia* which creep through their garden companions without overpowering them. These can easily be distinguished from such beautiful "thugs" as *Oenothera speciosa* whose creeping rootstocks are capable of doing battle and winning against such well-known invaders as the non-clumping forms of *Artemisia.* In addition to their blending qualities, many creeping plants offer a textural contrast to the leaves and flowers through which they weave.

Texture is an important consideration in perennial garden design. Plants with fine textures—small, airy sprays of flowers or narrow leaves—recede visually. Coarse textures hold the eye. *Hibiscus moscheutos,* with its large leaves and flowers is a good example of an eye-catcher. Changes in texture provide focal points in the border. For example, the bold golden daisies of *Rudbeckia fulgida* contrast with the delicate white flower sprays of *Artemisia lactiflora**. Adding another visual layer of texture to the garden are the airy "see-through" plants, such as *Verbena hastata,* taller species of *Aquilegia* such as *A. canadensis* with red and yellow flowers or *A. chrysanthus* with yellow flowers, and *Gaura lindheimeri,* which soften hard edges and provide a sense of depth to the garden.

Color, like texture, can affect our perception of visual space and provide a focal point in the garden. Warm colors (red, yellow, orange) shoot forward, shortening space. The use of large numbers of these warm-color flowered plants in a garden can make it appear smaller. Red, yellow and orange flowers and foliage colors are attention-getting, providing intense natural focal points in the border. Native plants with red flowers include *Lobelia cardinalis* and *Silene virginica;* yellows are represented by the many *Solidago* species and *Helianthus* species. Natives with true orange flowers are less common, but *Asclepias tuberosa* and *Lilium superbum* are examples.

Cool-colored flowers and foliage (blue, purple, green) recede from the eye and are more restful and soothing. The use of these colors can create a sense of distance and give a soft, misty quality to the garden. Good choices of blue-flowered natives are amsonias, scutellarias, *Lobelia siphilitica* and *Phlox divaricata. Verbena, Vernonia, Liatris,* and *Aster* species provide many shades of red-violet or purple. Green, the most prevalent color in nature, is provided in a variety of shades and tints by the foliage of herbaceous perennials, trees and shrubs.

White- and silver-foliaged plants intensify our perception of the colors associated with them. Hence, the red flowers of *Lobelia cardinalis* look brighter when viewed against the white flowers of *Boltonia asteroides* than when seen against the more closely related color hue of the golden yellow flowers of *Rudbeckia.* Placing complementary colors side-by-side (red-green, blue-orange, yellow-violet/purple) also intensifies the color effect and forces the eye to pause and refocus, creating natural focal points. The use of closely related colors in association with each other, however, creates a color harmony which allows the eye to pass over it and is more restful, (for example, red, yellow and orange flowers used together or pink and lavender flowers used together.)

Bloom colors are not the only color factor in the perennial garden. Silver-foliaged plants such as *Artemisia stellerana* and blue-foliaged plants like *Eryngium yuccifolium* have a brightening effect as do white flowers and complementary colors. Conversely, bronze, deep purple or brown-tinged foliage such as the chocolate-brown foliage of *Lysimachia ciliata* and purple-tinged leaves of *Viola labradorica* have a calming effect upon the colors adjacent to them in the garden.

The vast flora of the continental U.S. offers the thoughtful gardener almost unlimited choices of plants for the border, each of which can fulfill one or more of the design functions described above. The choices outlined below represent a few examples of fine native plants from which we can choose; many have a wide geographic range and are adaptable to all areas of the continental U.S. Others have a narrow range of distribution but have proven hardy and dependable both north and south of that range.

For sheer elegance in the spring garden, few plants can compete with a mature clump of *Baptisia lactea* (synonym: *B. pendula*), the white wild indigo. In spring many succulent-looking charcoal-gray stems emerge from the earth; reaching a height of three feet, they are soon clothed in dark gray-tinged green leaves. Above the foliage are spikes of creamy white flowers which are a striking contrast to the gray stems. The flowers open over a period of two weeks. Growing in dry open woods and clearings from Florida north to North Carolina, *B. lactea* grows best in well-drained soils and is hardy to Zone 6. When grown in full sun in a moderately fertile soil, it will produce many flower spikes and form a dense moundlike clump of foliage which creates an excellent background and contrast to other later-flowering perennials. Gardeners north of Zone 6 can substitute the equally beautiful northern species *Baptisia leucantha*, growing to four feet tall with a natural range from Minnesota south to Texas. (Botanists now lump this with *B. lactea* although horticulturally there are distinctions.) The white spikes of *Baptisia* make a nice contrast with the rounded forms of shrub roses and with the rounded flowers and vertical foliage of Siberian iris in the spring border.

Deserving of more notice is *Scutellaria incana*, the greater skullcap. Growing two to four feet tall, this beautiful perennial offers the gardener three-quarter inch, slightly fuzzy gray-blue flowers borne in spires from midsummer to frost. If the foliage is cut back by half in early June, many more flower spikes will be produced, and the plant can be maintained at a height of two and one-half to three feet. A very hardy plant, it grows from Canada south to Virginia and west to Missouri. In the garden its soft blue flowers are especially beautiful in late summer if planted next to white flowers such as *Boltonia asteroides* or a large silver-leaved mound of *Artemisia* 'Silver King.' It is an especially good contrast in early fall to pink-flowered forms of *Aster novae-angliae* and with violet-colored, late-fall-blooming *Aster grandiflorus*. In July, a soft and misty effect can be obtained by interplanting clumps of *Scutellaria incana* with the lacy white flowers of *Daucus carota* (Queen Anne's lace).*

Welcome at the end of summer are the red-violet flowers of *Liatris aspera*. Growing six

White wild indigo, Baptisia lactea, *adds a touch of sheer elegance to any spring garden. The creamy white flower spikes contrast with the gray stems.*

feet tall, three-quarters of the stem is covered in compact bracted flower buds which appear to be carved from ivory and pale green jade. Even before it flowers, *L. aspera* offers a sculptural quality to the garden which shows off noticeably against a dark green background such as an evergreen hedge. All the bracts turn a red-violet just prior to the emergence of red-violet threadlike flowers. The fully open flowers resemble one-and-a-half-inch fringed buttons. The flower spikes are so heavy that staking may be required; a single tall stake per stem works best. The flowers combine well with pink-flowered asters or *Boltonia* and contrast beautifully with *Rudbeckia triloba*, a dainty black-eyed Susan blooming from late summer through frost with flowers standing from warm golden-yellow near the black eye to butter-yellow at the tips of the petals. For a truly smashing effect, combine *L. aspera* with the airy pure-yellow Queen-Anne's-lace-like flowers of *Patrinia scabiosifolia** (three to seven feet tall) backed by the striking horizontally yellow-banded foliage of *Miscanthus sinensis* 'Strictus'.* *L. aspera* grows in well-drained soils from Ontario south to Texas and South Carolina. For gardeners with damp soil, *Liatris spicata*, a southern species growing in swamps, bogs and wet ditches, but hardy at least to Zone 3, would work equally well in the garden.

A dainty *Liatris* look-alike is *Carphephorus paniculatus* (formerly *Trilisia paniculatus*), native to damp areas of the Southeast coastal plain but adaptable to drier soils. It is hardy to Zone 6, growing 12 to 24 inches tall in sunny locations. In early fall single spikes of soft red-violet flowers emerge from dense grasslike clumps of foliage. It can be planted with *Chrysopsis mariana*, a dryland species whose clusters of bright yellow flowers bloom at the same time as *Carphephorus*. A larger species of *C. odoratissimus* grows to three to four feet and is more cold hardy.

The southern perennial border is brightened in April by the pale, steely-blue flower clusters of *Amsonia ciliata*. This native of the southeastern U.S. grows in the sandhills and in open sandy woodlands. Mature plants form dense clumps of stems clothed in narrow, dark-green leaves which add a fine texture to the garden. *A. ciliata* grows best in full sun and well-drained soil. In the spring garden, its blue flowers and fine foliage contrast beautifully with the yellow and green marbled foliage of *Sedum erythrostictum** 'Mediopictum', yellow-flowered *Aquilegia canadensis* 'Corbett' and the deeper blue flowers of *Sisyrinchium atlanticum* while the soft blue flower heads of *Phlox divaricata* repeat the blue of the *Amsonia* flowers.

Another choice native for the spring border is *Phlox pilosa*. Given a sunny or semishaded location, this 18-inch-tall phlox bears fragrant clusters of white-eyed, mauve-pink flowers for two-and-one-half months. A wide ranging species, it occurs from southeastern Connecticut to southern Florida, west to Wisconsin and south to Texas. In the garden it combines well with the large fringed lavender-blue flowers of *Stokesia laevis* and spiky veronicas; it is even more pleasing when combined with the pale red-violet flower spikes of *Penstemon smallii*.

Penstemon smallii grows 18 to 24 inches tall and bears spikes of flowers above dark green, red-backed foliage in late spring. If the old stalks are cut back, it will continue to produce new spikes through the summer. Occurring in a very limited range in lightly shaded woodlands and open banks in the mountains of North Carolina and Tennessee, it is surprisingly cold hardy (at least Zone 5). While flexible as to its light requirements, it requires sharp drainage and tends to be a short-lived perennial, requiring frequent division. It is easily grown from seed. In the garden, it combines well with the large yellow cup-shaped flowers of *Oenothera missouriensis* or the 20-inch tall flat yellow flower heads of *Achillea* 'Moonshine'* and *Chrysogonum virginianum*.

Hundreds of one inch white daisylike flowers cover six-feet-tall plants of ***Boltonia asteroides*** during August and September. Native to damp areas of the central and southeastern U.S., *B. asteroides* adapts easily to dry soils and flowers best in full sun. Prior to its bloom, the shiny silver-green foliage is an excellent foil for earlier blooming perennials such as *Echinacea purpurea.* A shorter selection of *B. asteroides,* 'Snowbank', grows to four feet. Combine the rounded form of *B. asteroides* with either of two blue salvias native to Texas, *Salvia azurea* var. *grandiflora* or *Salvia farinacea* and clumps of *Sedum* 'Autumn Joy'* for a pleasing late summer/early fall garden picture.

A soft pink-flowered form of *B. asteroides,* 'Pink Beauty', grows four feet tall. Plant it in combination with the shrubby *Lespedeza thunbergii**, whose drooping racemes of deep red-violet, pea-shaped flowers are a pleasing contrast to the rounded flowers and form of this *Boltonia.* The pink flower spikes of *Physostegia virginiana* contrast in form with both the *Boltonia* and *Lespedeza;* the colors of their flowers create a pleasing color harmony. Both *B. asteroides* and *P. virginiana* grow in wet soils but adapt to average to dry garden conditions.

Equally beautiful with *B. asteroides* is *Vernonia noveboracensis,* rising to a height of eight feet, depending on available soil moisture. Naturally occurring in wet meadows, stream banks, and roadside ditches throughout the eastern U.S., it bears dense clusters of tufted, deep violet flowers from July to September. Its tall, rounded form combines well with pink-flowered forms of *Aster novae-angliae* and the feathery pink-tinged flower panicles of *Eragrostis trichodes.*

Eragrostis trichodes is native from Illinois west to Colorado and south to Texas. It grows four to five feet tall and flowers from July to September; it tends to be floppy and should be grown through a wire hoop to prevent it from smothering smaller plants located nearby.

Flowering for three to four weeks in early fall, ***Solidago rugosa*** grows four feet tall. This native of eastern woods, meadows, fields, bogs and pine barrens is as adaptable in the garden as it is in its natural range, tolerating either wet or dry soils. The many fine-textured, arching, single-sided panicles of small yellow flowers complement fall-flowering asters such as *Aster novae-angliae* and *A. pilosus.* Combine it with *Liatris aspera,* or the shorter *L. graminifolia,* or *Boltonia asteroides* for an elegant look, or contrast its rounded form with the flower spikes of *Lobelia siphilitica* or *Scutellaria incana.*

An unusual member of the aster family, ***Aster concolor*** has upright stems two and one-half feet tall clothed in opposite, silky, gray-green leaves which are held vertically against the stems. At each leaf node is a single flower bud. In September, as these buds swell and begin to open, the stems arch gracefully in a cascade of deep violet-blue flowers. The flowers show off against the light gray-green foliage of wooly thymes and are equally beautiful spilling through the fluffy white clouds of *Euphorbia corollata.*

Often despised for its aggressive habits in the deep rich soils of the Midwest, ***Euphorbia corollata*** can be a well-mannered and useful addition to the perennial border. Growing from Ontario south to Florida and Texas, this member of the spurge family will grow in almost any garden. It may take up to three years for the creeping rootstock to become thoroughly established and for the stems to reach three feet in height. The lax stems weave easily among other flowers or can fill gaps left by summer-dormant plants such as oriental poppies. The small greenish flowers are produced in summer months and are surrounded by long-lasting white petallike structures which give the plant its frothy appearance. *E. corollata* combines well with *Gaillardia* and *Rudbeckia fulgida* and is elegant in combination with blue salvias, *Platycodon grandiflorus** (balloon flowers) and silver-foliaged plants.

Two very different verbenas for the border are the tall ***Verbena hastata*** and ***V. canadensis*** (rose verbena). *V. hastata* forms clumps with stems three to four feet tall clothed in green-toothed leaves ending in a green upright spike around which appear tiny lavender-blue flowers. This verbena flowers from late May till frost with the flower spike elongating all the while. Its effect in the landscape resembles a soft blue mist and, despite it height, it is an excellent addition to the front of the border, softening the view of the plants behind it. It is tough enough to combine with such aggressive 'thugs' as the beautiful white-flowered *Lysimachia clethroides** (gooseneck loosestrife). Add to this combination clumps of *Platycodon grandiflorus,** whose fat blue flower buds give rise to its common name, balloon flower, for a long-flowering midsummer combination.

Verbena canadensis is hardy to Zone 5 and is grown as an annual farther north. Its range includes the eastern seaboard from Virginia south, west to Iowa and Colorado and south into Mexico. In the South it bears clusters of fragrant flowers ranging from deep purple, dark and light lavender to pink, from early March to frost. In the milder parts of its range, its foliage turns a pleasing purple in winter, while in colder climates it may die back to the ground. In the garden this verbena seems to require dividing and soil replenishment every two years to assure the best bloom. For a spring effect, combine *V. canadensis* with *Phlox pilosus, Aquilegia* and *Iris tectorum.** Later in the year its rich purple flowers are an excellent complement to the golden flowers of *Rudbeckia fulgida* 'Goldsturm'.

Another little-known native, whose sprawling stems make it appear to be of creeping habit, is perennial blue day flower, ***Commelina erecta,*** whose habit belies its name. Unlike its larger, weedy, introduced, annual cousin, *C. communis,* it is a fine addition to the border. Its ruffled petaled flowers are larger and of a softer blue than the annual species and are produced over a long period from midsummer through early fall (though each flower lasts but a single day). It grows from New York to Florida and west to Texas. Allow the stems of *C. erecta* to clamber around the gray-blue lance-shaped leaves of *Eryngium yuccifolium* and back up both with the soft yellow flowers of *Coreopsis verticillata* 'Moonbeam'.

Among the longest-blooming of plants for the border is ***Gaura lindheimeri.*** It begins to flower in May while only 12 inches tall. Throughout its long season of bloom, the flowering stems continue to elongate, reaching six feet before frost finishes the last of its flowers. Seen from a distance, the plants have many stems bearing airy white flowers; on close examination the flower buds are tinged with red, and the old flower buds fade to a soft salmon-pink above green and red mottled stems. Fresh flowers are produced daily. *Gaura* grows on well-drained soils from Louisiana south to Texas and into Mexico; it is hardy as far north as Zone 6. It is important to site this plant carefully in the garden, for it produces a large woody taproot and resents disturbances. It is very tolerant of heat and drought. Grow it in the center of the border or near the front to take advantage of its see-through quality. Grown in front of a dark-flowered, dark-foliaged *Buddleia** such as 'Purple Prince', it is striking as it is rising from a mass of other white-flowered and silver-foliaged plants such as the white-flowered form of *Verbena tenuisecta**, *Euphorbia corollata,* and silver-foliaged *Artemisia* 'Powis Castle'.*

The plants mentioned above are only a small sampling of choice natives available for use in the perennial border so investigate the flowers of your region, and check the listings of the increasing number of nurseries which propagate natives for other ideas and suggestions.

See Table on next page for the common names and USDA hardiness zones of all the native plants mentioned in this article.

**Editor's Note: These plants are not U.S. natives.*

Table 1. Summary of native plants mentioned. Plants in boldface are featured in the article.

Scientific name	Common name	USDA Hardiness Zone
Amsonia ciliata	**blue star**	**6**
Aquilegia canadensis "Corbett'	columbine	2-8
Aquilegia chrysanthus	columbine	4-8
Artemisia stelleriana	beach wormwood	2-9
Asclepias tuberosa	butterfly weed	3-9
Aster concolor	**eastern silvery aster**	**5-9**

ter grandiflorus	large flowered aster	7-9
ter lateriflorus	calico aster	3-9
ter novae-angliae	New England aster	3-8
ter novi-belgii	New York aster	
ter pilosus	frost aster	
aptisia lactea	**white wild indigo**	**6**
oltonia asteroides 'Pink Beauty' 'Snowbank'	**thousand-flower aster**	**4-9**
ampanula rotundifolia	bluebells	2-8
arphephorus odoratissimus		6
arphephorus paniculatus		**6**
hrysogonum virginianum	green-and-gold	4-9
hrysopsis mariana	Maryland golden-aster	5-8
ommelina erecta	**blue day flower**	**4**
oreopsis verticillata 'Moonbeam'	whorled tickseed	3-9
chinacea purpurea	purple coneflower	
ragrostis trichodes	**sand love grass**	
ryngium yuccifolium	rattlesnake master	3-9
upatorium fistulosum	Joe-Pye weed	4-9
uphorbia corollata	**prairie-baby's breath**	**3-9**
ilipendula rubra	queen-of-the-prairie	3-9
aillardia	blanket flower	7-9
aura lindheimeri		**5-10**
libiscus moscheutos	marsh mallow	5-9
ris virginica	southern blue flag	
iatris aspera	**button snakeroot**	**3-9**
Liatris graminifolia	blazing star	6-9
Liatris spicata	blazing star	3-9
Lilium superbum	Turk's cap lily	5-8
Lobelia cardinalis	cardinal flower	2-8
Lobelia siphilitica	great blue lobelia	4-8
Lysimachia ciliata		2-8
Oenothera missouriensis	Missouri evening primrose	3-9
Oenothera speciosa	Mexican evening primrose	5-9
Panicum virgatum	switchgrass	3-10
Penstemon smallii	**Small's beardtongue**	**5-7**
Phlox divaricata	wild sweet William	3-8
Phlox pilosa	**downy phlox**	**3-10**
Physostegia virginiana	obedient plant	3-9
Rudbeckia fulgida 'Goldsturm'	black-eyed Susan	4-9
Rudbeckia triloba	**black-eyed Susan**	**5-8**
Salvia farinacea	mealycup sage	7-9
Salvia azurea var grandiflora	blue salvia	5-9
Scutellaria incana	**greater skullcap**	**2-6**
Silene virginica	fire-pink	3-8
Sisyrinchium atlanticum	blue-eyed grass	3-9
Solidago rugosa	**rough leaved goldenrod**	**4-9**
Stokesia laevis	Stokes' aster	6-9
Verbena hastata	**simpler's joy**	**3-9**
Verbena canadensis	**rose verbena**	**6**
Vernonia noveboracensis	**ironweed**	**5-8**
Vernonicastrum virginicum	Culver's root	3-9
Viola labradorica	Labrador violet	2-8
Yucca filamentosa	Adam's needle	5-10

Boltonia asteroides *'Snow Bank' bears hundreds of one-inch white daisylike flowers on four-feet-tall plants during August and September. The foliage is also pleasing.*

Native Plants As Ground Covers:

Suggestions from a Connecticut Gardene

Judy Glattstein

As any gardener knows, bare ground is an invitation for weeds to grow. If you do not mulch or plant, something will appear to occupy the open space. Use of plants as ground cover fills the space, and the plants serve to unify the garden. In addition, a drift or sweep of a single plant is visually pleasing. But not all plants are equally suited to function as ground cover.

Consider the dogtooth violet, *Erythronium americanum.* The handsome mottled leaves appear early in spring. But this plant goes dormant by late May or early June. This means that the ground is bare throughout much of the growing season. Any of the spring ephemerals, those plants which flower early and then go dormant, are a poor choice for this purpose.

What then, are the parameters we should use? A ground-cover plant should have neat attractive foliage. If the leaves are evergreen then the plant will also be interesting in late fall and winter. Flowers are a bonus, but are too short-term to be the definitive criterion. The plants should be spreading. Then fewer plants are required in the beginning. It is rare that a plant will meet all the above suggestions. They serve as a means of comparing one plant to another, and making a decision as to which will be selected for use as a ground cover.

In the wild, plants grow in a particular area, referred to as their range. Certainly they can be expected to grow in other areas with similar conditions of soil and climate. Often, these plants will be genetically adaptable to somewhat different conditions as well. Plants from the Piedmont can grow in New England. Us the original range as a starting point and exper ment from there.

One excellent choice is a woodland phlox *Phlox stolonifera.* It has neat evergreen foliag only a couple of inches high. The plants sprea by surface runners which root down at th nodes. Flowers appear in May, carried we above the leaves. Color is typically a soft blu Cultivars exist which provide the native pla enthusiast with lavender ('Sherwood's Purple' pink ('Sherwood's Pink') or white ('Bruce White') forms. This plant is easily propagate and relatively common in the nursery trade. *stolonifera* is found from Pennsylvania an Ohio south to South Carolina and Georgia.

Another favorite of mine is a non-flowerin plant. This is the Christmas fern, *Polystichu acrostichoides.* The lacy evergreen fronds pro vide winter interest. In the spring the new fronds, covered with chaffy brown scales uncoil and unroll. The new fronds stand erec and graceful through the summer. Then in autumn they begin to arch over and assume more horizontal habit. This fern does not ru and spread; it does make ever-increasing clump which can be lifted and divided to provide addi

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onal plants. This adaptable fern is found in the ild from Nova Scotia to southeastern Wiscon-n, south to central Florida and eastern Texas.

The glossy green leaves of the Japanese achysandra make it a popular component for nany shady landscapes. This common species lappens to have an American cousin. This is the llegheny spurge, *Pachysandra procumbens* vith softer, duller green foliage. Mature leaves xhibit a lovely mottling. This plant is evergreen n my garden (Zone 6), but is reported to be leciduous in more severe climates. Flowers are attractive fuzzy spikes like a white bottle-brush, n the spring.

P. procumbens is easy to propagate by cuttings taken in June. Use a gritty mix of equal parts sand and peat moss. Pack lightly into cell packs (those 6-compartmented units many annuals are sold in). Water well, then drain. Take the cuttings, wound each lightly down one side with your thumb nail. Dip in rooting hormone. Set the cuttings one to a compartment. Make arched supports from wire coat hangers. Cover a tray-full of six-packs with a clear plastic bag supported on the wire hoops so that it doesn't touch the cuttings. Set the "covered wagon" in a lightly shaded site out of direct sunlight. In a few weeks roots will form. This is an easy way to propagate many plants from cuttings. Our native pachysandra is found from Kentucky to Florida and Louisiana.

Mayapple , *Podophyllum peltatum,* is a quickly spreading plant suitable for large areas. It is deciduous. Given a shady site with moist

oamflower, Tiarella cordifolia, *has a column of mall white flowers on a slender stem in spring. Iere a clump combines with wild geranium, aneberry and bloodroot.*

soil the leaves will remain in good condition through summer. Often the leaves will begin to yellow and go dormant in mid-summer if the soil is dry. The white flowers nod, and are hidden beneath the leaves. They are followed by attractive fruits which are not edible. May-apple is found from Florida to Texas, north to Minnesota and Ontario.

Another good shade-tolerant ground cover is *Vancouveria hexandrum.* Called American barrenwort, this plant is reminiscent of epimedium, another Japanese import. The dainty foliage is made up of three oval leaflets. The delicate appearance disguises an iron constitution. Given the humus-rich soil and woodland shade it needs, the plant is very long-lived and vigorous. Small white flowers in the spring are an extra bonus. A northwest native, *Vancouveria* grows wild in Washington, Oregon and northern California.

Foamflower, *Tiarella cordifolia*, has mass of small white flowers on a slender stem abou eight inches tall in the spring. The leaves ar dense and form a good cover in moderat shade. Spreading by surface or just-below-su face runners, foamflower will make a larg colony. It is helpful if the colony is given a to dressing (light sprinkling) of compost in earl spring. Do not use fertilizer as the plant is easil "burned" and damaged foliage will result. Foam flower is native from Ontario and Michiga south to Georgia and Alabama.

A small shrub which is useful as a groun cover is pachystima, *Paxistima canbyi.* Grow ing about one foot high, this shrub does well i sun or light to medium shade with a sand

Woodland phlox, Phlox stolonifera *'Sherwood's Purple', blooms in May. This cultivar has lavender flowers and is fairly common in the nursery trade.*

Green and gold, Chrysogonum virginianum, *is a good choice for light shade. The dark green leaves contrast with the bright daisy flowers.*

peaty soil. The narrow evergreen leaves are slightly toothed near the tips. Grown where they receive some sun the leaves often turn an attractive bronze color in the fall. Flowers are inconspicuous. *Paxistima* is found on Appalachian mountain tops in Virginia and West Virginia.

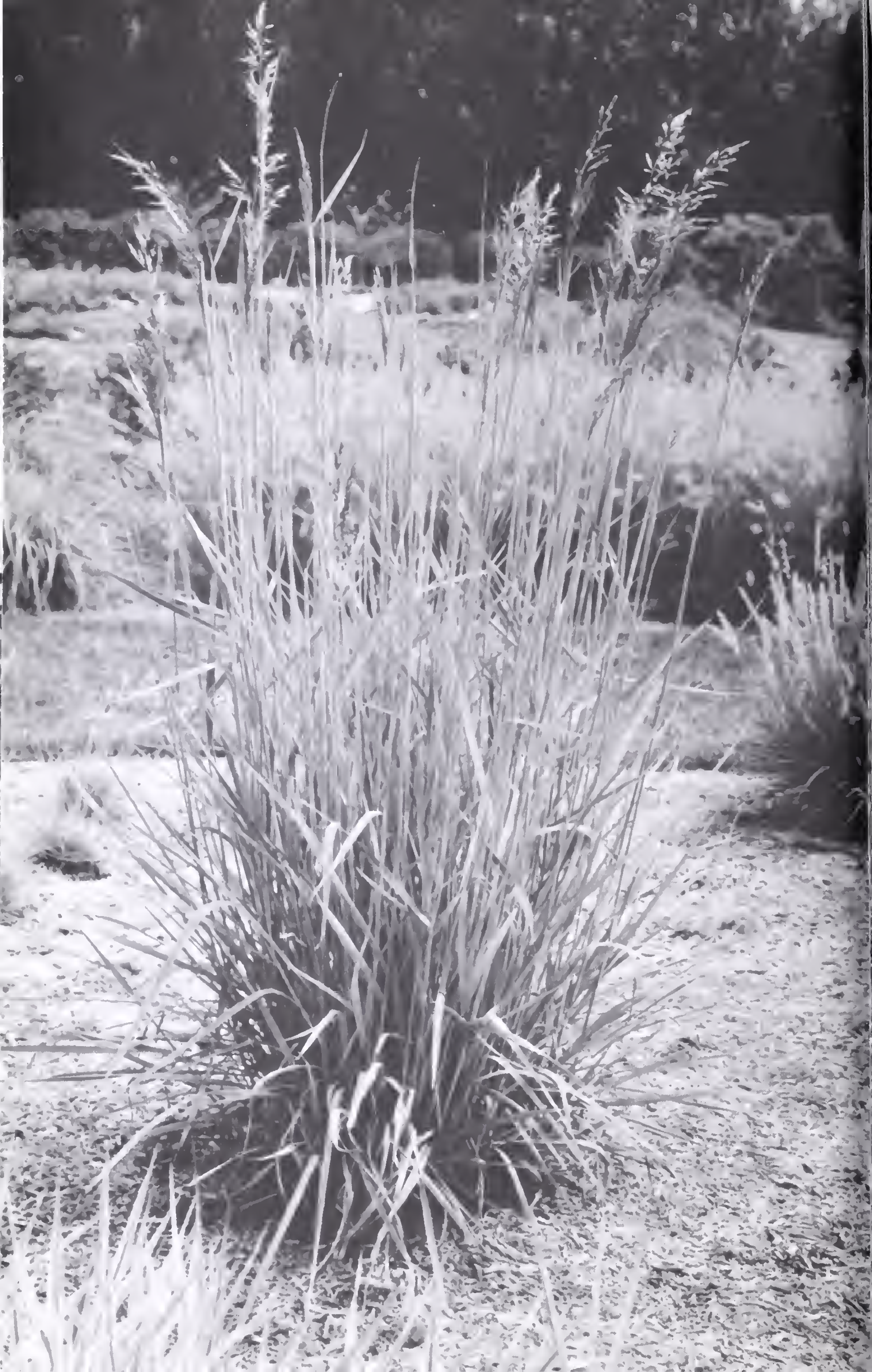
Another good choice for sun or light shade is green-and-gold, *Chrysogonum virginianum* var. *australe.* This is the very low-growing form of the species. The dark green leaves make a dense mat. Small bright yellow daisy flowers make a good display in the spring and some repeat bloom in areas with cooler summers. In northern areas snow cover is important for winter survival. Green-and-gold is native from Pennsylvania and West Virginia to Florida and Louisiana.

In very sandy soil areas with full sun nothing is better than our native juniper, *Juniperus horizontalis.* This standby of the nursery trade is available in several horticultural selections such as 'Bar Harbor' and 'Wiltonii' (also known as 'Blue Rug'). The needlelike foliage is a silvery-blue in the named forms, often turning to a purple-bronze in winter. Female plants have glaucous blue berries. *Juniperus horizontalis* has a native range from Nova Scotia to Alaska, south to New Jersey, Minnesota and Montana. Another useful species is *Juniperus communis* which is found in northern parts of Asia and Europe as well as North America. 'Gold Beach' is a creeping form with bright yellow-green needles which makes a dense, matlike ground cover. It is a selection from the Pacific Northwest.

Bear-berry, *Arctostaphylos uva-ursi,* is good for full sun and a sandy peaty soil, but can be difficult to establish (See page 75). Wintergreen, *Gaultheria procumbens,* is a charming evergreen woody plant for a humus-rich acid soil in part shade. It does not make a dense cover without a lot of attention to top-dressing and mulching. Galax, *Galax urceolata,* is a clump-forming evergreen plant with circular tooth-edged leaves which turn red-bronze in the fall. Minute white flowers are clustered on a long slender stalk. The clumps expand slowly and deer adore it as winter fodder. (Beware, this is a plant frequently dug from the wild and offered for sale.)

Wherever you intend to use ground-cover plants, site preparation is very important. Dig over the entire area to be planted, removing competing weeds and roots. Add soil amendments such as compost as necessary. Set the plants with spacing adjusted for their growth habits—Mayapple further apart than Christmas fern for example. Water the plants well and mulch. Shredded leaves or rough compost or pinebark mulch are especially suitable in a woodland setting. The latter or gravel would be good in sunny sites. Pay attention to watering the first season, especially during summer drought. Watch, and remove any weeds that may grow the first season. Going into winter make sure that woody plants in particular are well-watered. If snow cover is limited, consider protecting new plantings with evergreen boughs or salt hay.

The use of ground covers to unify the garden scene, to display a specimen plant, to reduce maintenance, are all as valuable in a native plant garden as in any other type of landscape.



Native American Grasses:

Superb Late-Season Perennials for the Garden.

Rick Darke

Like ferns, perennial grasses are often overlooked when considering plants for the wild garden, yet much of the beauty of natural "gardens" across the landscape of wild America is due to the presence of our native grasses.

Grasses uniquely contribute a fine-texured, mostly vertical line, providing stunning contrast to broad-leaved companions. Sunight plays wondrously through the narrow foliage, creating myriad changing patterns. Although individually minute, the flowers of many grasses are borne in profuse, upright clusters, their translucent parts glowing like candles in the setting sun. Grasses sway sensuously with the gentlest breeze, bringing movement and a delightful spontaneity into the gardened landscape.

Although most true grasses (members of the grass family, Gramineae) prefer sunny sites, they are otherwise very adaptable to a wide range of soil, temperature and moisture conditions, and are relatively disease-free. Maintenance generally consists of cutting-back old growth once a year and occasional lifting and dividing of clumps. Seed propagation is easy in most cases although selected forms such as those having particular foliage colors are best propagated by division.

Grasses are particularly suited to wildflower gardens since they reach their peak during late summer and fall, a time when many more typical wildflowers, especially the spring ephemerals, are at low ebb. Summer foliage colors from lush greens to bright blue are often followed by autumn orange, red and gold. Flower tints range from silver to bronze. Many grasses are effective long after the growing season, and their winter hues of chestnut, almond, russet and fawn are excellent companions to brightly colored shrubs such as the red winterberry holly, *Ilex verticillata.* Here are some of the most interesting and reliable performers.

Many of the finest native grasses for gardens trace their origins to our once-vast tallgrass prairies and great plains, long since replaced by amber waves of exotic grain. The full range of native prairie species extends over much of the U.S., and includes some of our cold-hardiest grasses. Although requiring full sun, most are very drought-tolerant. Big bluestem, ***Andropogon gerardii***, a clump-forming giant, grows four to eight feet tall and in August produces three-parted flower heads resembling turkey's feet. The foliage turns from rich green to copper-red in fall. Little

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Rick Darke*'s work as Longwood Gardens' curator of plants has taken him around the world in search of new plants for American gardens. His special interests include native American plants and ornamental grasses, both native and exotic. His home garden in Pennsylvania features wildflowers and grasses.*

Indian grass, Sorghastrum nutans *'Sioux Blue', is near the top of the list of all garden grasses. 'Sioux Blue', a vegetatively propagated cultivar, has foliage of the softest powder blue.*

bluestem, *Andropogon scoparius* formerly ***Schizachyrium scoparium,*** is common in prairie remnants and dry hills over much of the eastern U.S. Usually under three feet in height, its dense clumps of fine-textured foliage are delightful in mass. Summer leaves vary from bright green to aqua blue, and autumn colors include every shade of copper, red and bronze. Along the upper part of each stem, silky-white seedheads glow in the sunlight from October through to the following spring. Cultivar 'Aldous' has glaucous blue leaves. Close relative broom sedge, ***Andropogon virginicus,*** is not particularly associated with the prairie, but is native on open ground, sterile hills and sandy soil over much of North America. It is similar to but slightly coarser than little bluestem, and has many variant forms of garden interest.

An 18-inch fountain of the finest textured leaves springs from each clump of prairie dropseed, ***Sporobolus heterolepsis.*** Overtopped by delicately open panicles of flowers in early August, the foliage turns pumpkin-orange in time for Halloween.

Indian grass, ***Sorghastrum nutans,*** is near the top of the list of all the garden grasses. A once constant companion to big bluestem in the tallgrass prairie, it is still found native in nearly every state from Arizona east. Strictly vertical in habit, it is variable in stature and foliage color. Indian grass can top six feet in the prairie but is more commonly four feet tall in the east. The medium-textured foliage is usually a deep green, but glaucous forms are frequent in prairie strains. 'Sioux Blue', a vegetatively propagated cultivar, has foliage of the softest powder blue. Indian grass produces golden-bronze terminal flower clusters beginning in late August. Hundreds of conspicuously bright yellow pollen sacs dangle on short threads from each cluster, tying in well with a lemon-flowered *Coreopsis verticillata* 'Moonbeam' that might be planted nearby. Fall color is a golden-orange.

In eastern meadows, Indian grass is often accompanied by purpletop, *Tridens flavus.* Flowering two to three feet tall from August to September, purpletop can truly put a purple top on sunny meadows, and is magnificent when it occurs in huge sweeps alternating with the golden-bronze of Indian grass.

Little bluestem is common in prairie remnants and dry hills over much of eastern U.S. It is usually under three feet in height.

Its flower stalks reaching seven feet in height, prairie cord grass, *Spartina pectinata,* once covered hundreds of square miles in bottomlands too moist for other prairie grasses. Well adapted to average garden moisture, it spreads somewhat rapidly by rhizomes. Cultivar 'Aureomarginata' is a selected garden form with bright yellow leaf margins.

In nature, the tall prairie grasses were often accompanied by bold, broad-leaved plants including prairie dock *Silphium terebinthinacium,* compass plant *S. laciniatum,* and purple coneflowers *Echinacea purpurea* and *E. pallida.* Such plants make excellent garden companions to the grasses, providing a dramatic interplay of contrasting textures.

The Great Plains are drier than the tallgrass prairie, and grasses there are typically shorter-growing types. Two garden-worthy plains species belong to the genus *Bouteloua.* At 12 inches tall, blue grama, also called mosquito grass, *B. gracilis,* is among the shortest of our native ornamentals. Its curious flowers, beginning in June, are arranged like tiny brushes suspended horizontally from the tip of each stem. It is best in a sunny garden spot near a path or atop a ledge, where its detail can be osely appreciated. Side-oats grama, *Bou- loua curtipendula,* is a useful medium-sized ecies suitable for mass planting. Starting in ly, ruler-straight flowering stalks radiate om the relatively low-mounded foliage. Indi- dual flower clusters are attached at an angle ong one side of each stalk and are purple at rst appearance, bleaching to sand. Additional alks are produced through the rest of the rowing season until a complete arc is formed. ide-oats grama is native over much of the entral U.S.

The range of many grasses extends beyond orth America to Europe and Asia. A familiar arden plant, the blue-leaved sheep fescue, *estuca ovina glauca,* grows natively in sunny pen woods and stony slopes in our north- vestern states, but is also widespread in urasia. Reed canary grass, *Phalaris arun- linacea,* is native to river banks and other noist, sunny places in most of our northern tates, and is also a Eurasian native. Known as gardener's garters or ribbon grass, a form with oldly white-variegated foliage, *P. arun- linacea picta* has been a popular garden plant or over a century. Wood millet, *Milium ffusum,* is native to both the northeastern U.S. and Eurasia. Cultivar 'Aureus' is valued for ts bright chartreuse leaves in early spring, which later darken to green. Another American-Eurasian native, tufted hair grass, *Deschampsia caespitosa,* is useful for its evergreen basal foliage and fine-textured flowering effect. The striking gray-blue leaves of American dune grass, which is now considered to be of the same species as the European blue lyme grass, *Elymus arenarius,* offer the opportunity for exciting combinations with summer flowers.

Switch grass, *Panicum virgatum,* grows three to five feet tall in a variety of dry to moist habitats in nearly all states from Nevada east. Upright in habit, it produces masses of finely branched flower clusters by mid-August. In typical forms, the green leaves turn gold in autumn although selection 'Heavy Metal' offers steel-blue summer foliage, and the foliage of 'Hanse Herms' turns deep burgundy-red in fall. Both are propagated by division. The unusually wide leaves of relative *Panicum clandestinum* (or *Dichanthelium clandestinum,* as this has recently been classified), deer-tongue grass, are responsible for the common name. Although it can be weedy in small gardens, the tawny mass of foliage persists attractively through winter in dry or moist meadows.

Bottlebrush grass, *Hystrix patula,* appropriately named for the structure of its terminal flower clusters, and wild-oats, *Chasmanthium latifolium,* which produces flat oatlike pendulous flower spikes, are native to woodlands in the eastern states. Both are well suited to shady gardens, although wild-oats does equally well in full sun with adequate moisture, its autumn leaves turning to gold and its flower spikes to salmon-brown.

American grasses, like much of our American flora, have been underexplored as to their garden potential, often being passed over in favor of exotic species. With renewed interest in our own floral heritage, many native garden gems are coming to light; for instance, a number of species of plume grass (*Erianthus* spp.) which inhabit moist soil on the Coastal Plain from New York south to Florida and west to Kentucky. Narrowly upright, and varying in height from six feet (bent-awn plume grass, *Erianthus contortus*) to over nine feet (sugarcane plume grass, *E. giganteus*), these elegant, stately grasses are topped by plumelike flower clusters which are effective all winter. Fall foliage is red to dark purple. All are well adapted to sunny positions in average garden soils.

Our West Coast flora also includes a number of clump-forming grasses, little-known but superbly suited to garden use. Highlights are: California fescue, *Festuca californica,* with bluish leaves to two feet tall on dry open ground in Oregon and California; deergrass, *Muhlenbergia rigens,* a southern California native producing whiplike flower panicles in summer or fall; and pacific reed grass, *Calamagrostis nutkaensis,* a native from California to Alaska, whose reedlike flower clusters change gradually from purple-bronze to beige.

Garden in the Woods

David R. Longland

"Garden in the Woods is a dream in the realization, a year's long dream about a big wild flower sanctuary in which plants will be grown, their likes and dislikes discovered, and the knowledge gained passed on in an effort to curb the wholesale destruction of our most beautiful natives. This is to be our contribution to conservation." Proclaiming this their mission in 1934, Garden cofounders Will Curtis and Howard "Dick" Stiles began to gather and grow botanical treasures from all over North America.

Will Curtis purchased the Garden property in 1931, greatly inspired by its diverse, glacier-carved terrain of winding eskers, streams and kettlehole ponds. Trained as a landscape designer at Cornell University, Curtis felt strongly about the romantic appeal of naturalistic gardens. Dick Stiles, inspired by Curtis' enthusiasm and determination, became an avid horticulturist with a special flair for garden design. Over the course of four decades, these men established thousands of wildflowers, ferns, shrubs and trees in both natural and modified settings on this remarkable property.

In order to secure their "dream in the realization," Curtis and Stiles entrusted the Garden to the New England Wild Flower Society in 1965. The Society's chartered purpose was to promote the horticulture and conservation of native American plants through education and research. Today, as the Society's botanical garden and headquarters, Garden in the Woods contains the largest landscaped collection of wildflowers in the Northeast. The Garden has become one of the nation's chief conservators of rare native plants, such as Oconee bells, *(Shortia galacifolia)*, spreading globeflower, and climbing fern *(Lygodium palmatum)*. Also, the Garden is a showcase of unusual cultivars of wild plants like albino cardinal flower, *(Lobelia cardinalis* 'Alba'*)*, double-flowered trillium *(Trillium grandiflorum petalosum)* and bloodroot, dwarf hemlocks, *(Tsuga canadensis* cultivars), variegated wild oats *(Uvularia sessilifolia* 'Variegata') and many others.

Visitors who appreciate the regenerative spirit of nature and art will revel in a hor-

Here is the spring path at Garden in the Woods, Framingham, Massachusetts.

***David R. Longland**, as director of Garden in the Woods in Framingham, MA, oversees the management and development of garden programs and operations. He has special interests in native plants, garden design and habitat restoration.*

icultural symphony of contrasting forms, textures and seasonal colors at Garden in the Woods. Trails meander over 45 rolling acres, where 1500 varieties of wild plants flourish in a series of specially designed, naturalistic gardens: Rich Woodland Groves, Lily Pond, Rockeries, Sunny Bog, Pine Barrens, Meadow, Western Scree and Laurel Bend—a unique display of drought-tolerant wildflowers for dry New England landscapes.

The Garden's horticultural staff grows both rare and common wildflowers for display, for sale to visitors, and for conservation and research. In keeping with the original purpose of Garden in the Woods, "the knowledge so gained" is disseminated through lectures and publications which promote the conservation of native American flora. The New England Wildflower Society sponsors a great variety of educational programs at the Garden, in response to the wide range of interests expressed by members and visitors.

Photo by Gottscho-Schleisner

Many Trillium *species are displayed at Garden in the Woods. Most bloom in May and can be seen while walking the many trails.*

From spring through fall, Garden in the Woods offers a kaleidoscopic succession of colorful wildflowers, including: liverworts *(Hepatica* spp.*)* and trailing arbutus *(Epigaea repens)* in April; lady's-slippers *(Cypripedium* spp.*)* and trilliums *(Trillium* spp.*)* in May; prickly pears *(Opuntia* spp.*)* and pitcher plants *(Sarracenia* spp.*)* in June; Turk's cap lilies, *(Lilium superbum)* and blazing stars *(Liatris* spp.*)* in July; Cardinal flowers *(Lobelia cardinalis)* and turtleheads *(Chelone* spp.*)* in August; and asters *(Aster* spp.*)* gentians *(Gentiana* spp.*)* and brilliant foliage in autumn.

Garden trails are open daily from 9 a.m. to 4 p.m. *except Mondays,* April 15 to October 31, and an admission fee is charged to non-members. The offices and library are open Tuesday through Friday, 9 a.m. to 4 p.m. year-round.

For more information contact:

Garden in the Woods
Hemenway Road
Framingham, MA 01701
(617) 877-7630; 237-4924

The Connecticut College Arboretum
New London

Sally Taylor

The Connecticut College Arboretum was established on 64 acres by George Avery in 1931 in southeastern Connecticut outside the small city of New London. The original plan of the Arboretum "dramatized an existing grove of ancient hemlocks which grew atop a 40-foot granite cliff." The hemlock grove was given to the College in 1911 by a New London family who had owned it since the 1600s; the land was originally bought from Owaneco, the son of the Mohican Indian Chief Uncas. The ravine, cliff and hemlock setting dominated the old farm site (which was crossed by colonial stone walls) with its dramatic, magnificent granite outcroppings and glacial boulder train. The topography was well suited to become an arboretum, with gently rolling hills and small valleys. One rock-strewn depression, a red maple swamp, became a pond when the small stream was dammed and seasonal flooding created a focal point and backdrop for subsequent construction of the formal entrance opening onto the stately Laurel Walk.

The only building in the Arboretum is Buck Lodge, constructed of fieldstone and cedar, which is nearby the Outdoor Theatre. The Lodge, which has simple facilities and a magnificent stone fireplace is available to the public by arrangement through the Botany Department Office. The Outdoor Theatre was created with stage, "wings" and seating area to serve as a location for dance production and College exercises. In 1938, a hurricane struck New London directly, and all but six of the 130 magnificent hemlocks up to three feet in diameter were blown down. Only those growing within the ravine were spared. As time passed, regeneration of the oak/beech/maple forest surrounding the hemlocks repaired the scars, and little evidence of the disaster remains except for the massive throw mounds and decayed trunks of the fallen giants. Paths lead to the area from the Williams Street entrance. Today the Arboretum has grown to approximately 425 acres, including habitats as diverse as a true bog and a salt marsh connecting a rocky wooded island in the Thames River to the mainland.

The emphasis of the plant collection has remained on study and preservation of woody species native to Connecticut and New England. The 20 acres closest to the Main Entrance and the Laurel Walk contain flowering shrubs and trees of the rose, legume, heath and honeysuckle families as well as a woodland wildflower garden which is connected to a newly created Conifer Garden.

The azalea collection includes all of the native species which will grow in our area. The original plantings of pinxter flower *(Rhododendron periclymenoides)*, rose-shell azalea *(R. prinophyllum)*, swamp azalea *(R. viscosum)* and flame azalea *(R. calendulaceum)* flank paths leading past the Laurel Walk with its backdrop of massive rosebay rhododendron *(R. maximum)*. These 50-year-old plants flower during May and late June in the high shade of large tulip trees and red maples. A newer collection includes rhodora *(R. canadense)*, plum leaf azalea *(R. prunifolium)* and coast azalea *(R. atlanticum)* as well as evergreen Carolina rhododendron *(R. carolinianum)*. The plum leaf azalea creates a startling display of orange-red flowers in late July and August.

***Sally Taylor** has been in the Department of Botany at Connecticut College for 25 years and associated with the Arboretum for 20 years. Her special interests are native azaleas and the use of native shrubs and trees in ornamental garden plantings. She has also served as a guest editor for* P&G.

Photo by Sally Taylor

The azalea collection includes native species which will grow in the area. Many flank Laurel Walk and can be seen in flower in May and June.

Early to mid-June is the best time to visit the new collection of mountain laurel cultivars (*Kalmia latifolia*), which flower at the same time as the plants along the original Laurel Walk. The wild laurels with pale pink to deep pink buds and flowers have been hybridized by Richard Jaynes and others to produce plants with scarlet buds and flowers intricately banded in red. Leaves vary in shape and color from normal, dull-green oval to narrow, willowlike and highly glossy.

One demonstration naturalistic landscaping area contains native silverbell (*Halesia carolina tetraptera*, formerly *H. carolina*), flowering in May, yellowwood (*Cladrastis kentukea*) flowering in June, and sourwood (*Oxydendrum arboreum*), flowering in August. A second larger area features highbush blueberry (*Vaccinium corymbosum*), and a 50-year-old huckleberry (*Gaylussacia baccata*) clone which has been maintained by techniques of naturalistic landscaping pioneered by the Arboretum.

The favorite shrub of the Arboretum collection is the native highbush blueberry. We call it the aristocrat of our native shrubs because of its broad seasonal interest which includes red winter twigs, small bell-like flowers in spring, glossy foliage in summer, blue fruits and colorful foliage in fall. The blueberry branching structure is naturally contorted because the twigs have false terminal buds, each year growing at a slight angle from the stem, creating a zig-zag appearance to the branches when they are young. Mature plants may be pruned to emphasize this character. We feature several of these older plants in the Naturalistic Landscape areas, and blueberries have been used successfully as ornamental plants near campus buildings. Highbush blueberry is not a clonal plant and it tends to remain single-stemmed, unlike its cousins of the blueberry barrens of northern New England.

The notable small tree to see in the Arboretum in fall and late summer is sourwood (*Oxydendrum arboreum*). Long after most flowering trees have made their showing, its long slender clusters of white bells appear, giving a clue to its relationship with the native andromeda. The appearance of the flowers in late July is a welcome addition to the sequence of flowering trees. The flowers are followed by small capsules which persist until the leaves have dropped, giving the tree the unusual appearance of continuous flowering. The leaves are long oval, glossy green, and somewhat leathery. They begin to turn to the characteristic deep red by the first of September, and remain on the tree making a brilliant show until the last fall color has gone from the landscape.

Sourwood ranges in size from a large shrub to a medium-sized tree and is unusual in flowering profusely when it is young and small. Its form tends to be narrow and vertical when young, with leaves clothing the branches low to the ground, so it rapidly makes a satisfactory specimen tree. Coloring is most brilliant in full sun, less so in semi-shade. ❀

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1982. 56 pp.

For more information contact:

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Wildflower and Native Plant Garden

Brandywine Conservancy Brandywine River Museum, Chadds Ford, Pa

F. M. Mooberry

Four plants sharing the same common name, black-eyed Susan, are all of the genus Rudbeckia (R. hirta, speciosa, triloba *and* fulgida) *and provide an extended sequence of blooms of different forms, textures and sizes.*

Surrounding the Brandywine River Museum is an extensive wildflower and native plant garden which exemplifies the Brandywine Conservancy's purpose to preserve, utilize and display artistic, natural and historical resources of the Brandywine region.

The display garden is filled with wildflowers that are easy to grow and suitable for property owners to raise in their gardens. Plants are chosen to match the habitat rather than changing habitat to suit the plants. A large number of sun-loving species grace the parking lot's islands and are an important and integral part of the native plantings. A succession of blooming plants begins early in April with bloodroot, *Sanguinaria canadensis*, and ends in late November with the last wildflower of the year, fringed gentian, *Gentianopsis crinita*.

The artists represented in the fine arts collection of the Brandywine River Museum often used wildflowers as subjects. Many of these wildflowers are included in the garden.

Blooming shrubs and native flowering trees add to nature's pulsebeat as spring unfolds. Bluebells, *Mertensia virginica*, grow in beautiful profusion on the floodplain of the Brandywine and are featured plants of the spring wildflower garden. Their trumpetlike flowers are pink in bud and then turn sky blue as they open. A native plant that adapts well to the home garden, this perennial becomes dormant, dying back to the ground and vanishing completely from sight by midsummer, not emerging until its purple leaves and buds break through soil the following April.

Foamflower *(Tiarella cordifolia)*, wild bleeding heart *(Dicentra eximia)*, green and gold *(Chrysogonum virginianum)*, wild ginger *(Asarum canadense)*, wood poppy *(Stylophorum diphyllum)*, Jacob's-ladder *(Polemonium reptans)*. Miami mist *(Phacelia purshii)* and native azaleas *(Rhododendron* spp.) are additional spring favorites.

All regional habitats are represented in the garden, from full sun to deep shade, rich to thin sterile soils, from dry to standing water sites. An essential part of the garden is the Museum parking lot's water run-off retention basin which varies in depth and provides a habitat for spring's wild blue iris *(Iris ver-*

F. M. Mooberry *has been coordinator of horticulture for the Brandywine Conservancy and River Museum, Chadds Ford, PA since 1977. Her responsibilities involve both cultivated and natural areas; she manages design, maintenance and propagation for wildflower and native plant gardens. She conducts environmental impact surveys and provides meadow-management expertise for Conservancy and other lands. She is author of* Brandywine Wildflowers *and co-author of* Grow Native Shrubs in Your Garden.

icolor), golden ragwort *(Senecio aureus)*, nd summer's swamp rose-mallow *(Hibiscus alustris)*, followed by fall's cardinal flower *Lobelia cardinalis)* and blue lobelia *(L. iphilitica)*, all moisture loving species.

Summer brings the brilliant butterfly weed *Asclepias tuberosa)* as well as the Turk's-cap nd Canada lily *(Lilium superbum)* and *(L. anadense)*, wild bergamot *(Monarda istulosa)* and blazing star *(Liatris spicata)*.

Four plants sharing the same common ame, black-eyed Susan, are all in the genus *Rudbeckia (R. hirta, speciosa, triloba* and *fulgida)* and provide an extended sequence of blooms of different forms, textures and sizes.

The month of September is host to New York ironweed *(Vernonia noveboracensis)* and Joe-Pye weed *(Eupatorium fistulosum)*. Continuing in bloom from late summer are the long-flowering trumpet vine *(Campsis radicans)* and turtle head *(Chelone glabra)*.

New England aster *(Aster novae-angliae)* and the frost asters *(Aster* spp.) are combined with goldenrods *(Solidago* spp.), which bloom in both sun and shade to bring a glorious finale in October and November.

At the Brandywine Museum a succession of blooming plants begins early in April and end in late November with the last wildflower of the year. Blooming shrubs and native flowering trees add to nature's pulsebeat.

Over 250 species of wildflowers, shrubs and trees are to be found in the gardens, all easily propagated and adaptable for use by home gardeners.

The Conservancy's volunteers promote the conservation of wildflowers and native plants. To accomplish this important goal, the garden volunteers collect, clean and package over 100 different wildflower seeds. These are used for growing plants for the garden and are also packaged for sale to the public in the Museum shop.

Another important objective is the propagation program of native plants which culminates in a popular May plant sale. This sale enables the home gardener to purchase plants that were grown from seed rather than collected from wild populations. The volunteers also maintain a garden cart full of blooming plants which are available for purchase during the remainder of the gardening season. ❁

Guided garden tours are available.

For more information contact:

The Brandywine River Museum
Brandywine Conservancy
Route 1 and Route 100
Chadds Ford, PA 19317
(215) 459-1900

Photo by Chris Potter

Visitors along the North Carolina Botanical Garden nature trails pause to read interpretive marker.

North Carolin Botanical Garden

Ken Moore

A visit to the North Carolina Botanical Garden will provide opportunities to enjoy and learn about native plants in a variety of natural and cultivated settings.

The Garden administers 598 acres of forests and open lands, much of which is managed to preserve the diversity of the regional flora and fauna for public appreciation and University teaching and research. Approximately 100 acres are traversed by nature trails through the local Piedmont forest. Ten acres are under intensive cultivation, including the Garden's historic and beautiful four-acre Coker Arboretum in the center of the campus of The University of North Carolina at Chapel Hill. At the time of this writing, the Garden, under the leadership of Garden Director, Dr. Peter S. White, is involved in master planning and landscape design work. This means by the time you visit, you may be watching the construction of a new visitors' center or the expansion of the native plant Habitat Gardens. At whatever time you may visit the Garden, you will see native plants in quantity, and staff or volunteers are available to provide answers to specific inquiries.

The Habitat Gardens are the heart of the native plant collections. Plants characteristic of the North Carolina mountains, coastal plain and sandhills are displayed in an acre of simulated habitat plantings. Walking through these distinct areas a visitor may experience a sense of being in the larger natural area represented. The Mountain Habitat Garden is a shady area of hemlocks and tulip-poplars with mountain

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***Ken Moore** is assistant director of the North Carolina Botanical Garden. He has been a leader in work with native wildflowers and a major force behind the Garden's "Conservation through Propagation" and "Wildflower of the Year" programs.*

urels and rhododendrons providing a setting or many ferns and wildflowers characteristic f the western counties of North Carolina. rilliums and other mountain wildflowers are t peak bloom during April and May each year.

The Coastal Plain and the Sandhills Habitat ardens, both of which are open to the sun, make the Mountain Habitat Garden, in contrast, an inviting cool retreat during hot summer days. Fire is used as a seasonal part of the management of the Coastal Plain and Sandhills Habitats because, in nature, such habitats are subjected to fires on a much larger scale. Fire used as a management tool at the Garden, demonstrates to the public that fires, in certain situations, are beneficial. In the case of the Coastal Plain Habitat, fire maintains the open habitat necessary for the survival of many wildflowers such as fringed orchids and pitcher plants. Visitors during September and October, even after early frosts, are surprised to find the Coastal Plain Habitat Garden at its peak with masses of blue, yellow and white flowers of species characteristic of the eastern lowland counties of the state. The Sandhills Habitat is characterized throughout the year by the exposed white sandridges towered over by long-leaf pines *(Pinus palustris)* and scrubby turkey oaks *(Quercus laevis)* so characteristic of this particular part of North Carolina.

Wildflower borders situated around the Totten Center visitor area are of peak interest beginning with wild columbine *(Aquilegia canadensis)* in April and ending with masses of goldenrod *(Solidago* spp.*)* and blue and white asters *(Aster* spp.*)* in mid-October. These wildflower borders demonstrate that there are many wildflowers and "roadside weeds" appropriate for home gardens and urban landscapes. The "Wildflower of the Year," a wildflower species selected cooperatively each year by the North Carolina Botanical Garden and The Garden Club of North Carolina, Inc., is prominently displayed in the wildflower borders. The "Wildflower of the

A visit to this garden will provide opportunities to enjoy and learn about native plants in a variety of natural and cultivated settings.

Year" project is a conservation activity, one of many of the Garden's "Conservation Through Propagation" programs, which promotes an easy to propagate and cultivate North Carolina wildflower each year. For example, cardinal flower, *Lobelia cardinalis,* which was the first species selected, is displayed in several locations to attract hummingbirds from July through September. During the growing season, plants and seeds of the "Wildflower of the Year" are available to visitors.

The carnivorous plants are the most popular and entertaining. *Dionaea muscipula,* Venus's-flytrap, is the most famous plant at the Garden. It occurs throughout the Coastal Plain Habitat Garden, as it occurs in nature in the coastal plain of North and South Carolina and nowhere else in the world. It flowers in early June. There are numerous flytraps in the carnivorous plant display bed, where visitors, young and old alike, enjoy "fooling" the plants into action. Visitors learn how to trick the plant by reading the labels placed around the display beds. The carnivorous plants collection at the Garden includes pitcher plants *(Sarracenia* spp.), sundews (*Drosera* spp.) and butterworts *(Pinguicula* spp.*)* native to the southeastern U.S. Visitors will learn that some are very rare and that the habitat of these interesting plants are generally threatened by various activities of society throughout our nation. The Garden's propagation program provides the visitor with opportunities to observe seedling carnivorous plants as well as hybrids.

Visitors interested in gardening with native plants will find a wealth of information by making inquiries of the Garden staff. Printed materials relative to wildflower propagation and cultivation, sources of plants and seed, and other pertinent information are available upon inquiry. A limited selection of propagated wildflowers are generally available for purchase through the courtesy of the Garden volunteers who are very active in supporting

Fire is used as a seasonal part of the management of the Coastal Plain and Sandhills Habitats.

Father and sons take note of aquatic life in one of the pools of the Coastal Plain Habitat.

the propagation and conservation activities of the Garden.

Native plants are also displayed throughout the Plant Families Garden, where visitors observe that plants such as the native atamasco lily *(Zephyranthes atamasco),* garlic chives and asparagus are very closely related to the lily family. Another of many interesting families displayed is the aster, or composite family, which includes the goldenrods, ragweeds, blackeyed Susans and horticulturally bred marigolds and zinnias.

Native plants displayed throughout the Mercer Reeves Hubbard Herb Garden vary from poison ivy, oak and sumac *(Rhus* spp.*)* in the poison garden to Jack-in-the-pulpit *(Arisaema triphyllum)* which occurs in the poison, medicinal and American native herbs section of this comprehensive garden of plants of value for society.

Hours of visitation for the special collections around the Totten Center are Monday–Friday excluding holidays. Weekend hours from mid-March–mid-November are 10 a.m.–5 p.m. Saturdays and 2–5 p.m. Sundays.

The Garden maintains an active schedule of educational programs, field trips and special events throughout the year. These are described in advance in the Garden's bimonthly newsletter which is distributed to members of the Botanical Garden Foundation.

Information on these activities and on scheduling group tours and appointments with staff may be obtained by writing the Education Coordinator, North Carolina Botanical Garden, 3375 Totten Center, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina 27599-3375 or by calling 919-967-2246 weekdays, 8 a.m.–5 p.m.

A volunteer tour guide tells a class about longleaf pine, Pinus palustris.

The Crosby Arboretum

Picayune, MS

Chris J. Wells

With greater value being placed on our natural heritage, The Crosby Arboretum is a treasure of the Gulf South region. It allows us to learn about native plants and plant products so that we may use them to their best advantage while ensuring their genetic perpetuation. Through The Crosby Arboretum, aesthetic, agricultural, scientific and industrial contributions of native plants and ecosystems can be examined in a real-life setting.

Since its beginning in 1979, The Crosby Arboretum has become a premier native plant repository for the region. The Arboretum protects the region's biological diversity and provides a place for the public to enjoy plants native to the Pearl River Drainage Basin. The Crosby Arboretum uniquely provides for the study and enjoyment of plants in their original habitat.

The Arboretum consists of the 64-acre Pinecote, the Native Plant Center of The Crosby Arboretum, adjacent to Interstate 59 south of Picayune, Mississippi. The displays within the Center are naturalistic plant communities reflecting the beauty and diversity of

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***Chris J. Wells** is the superintendent and botanist for The Crosby Arboretum. He began his formal botanical education upon leaving the U.S. Navy in 1974 and entering Northwestern State University in Natchitoches, LA. As an undergraduate he accompanied several botanical expeditions to Latin America. In 1984, he accepted his position with the Crosby Arboretum and received his masters degree in biological sciences from Mississippi State University.*

the region. Each is designed to display the successional changes through which a natural plant system may pass. Fire is used at Pinecote and natural areas as an essential management technique for pine savannas and bogs.

Pinecote includes the Piney Woods Lake where native water plants furnish habitat for aquatic wildlife and waterfowl. Built to complement both artistic and functional aspects, Pinecote Pavilion was designed by internationally known architect Fay Jones, of Fayetteville, Arkansas. The pavilion, bridges and other architectural amenities are designed in harmony with nature. Thus, Pinecote is used for the quiet, reflective enjoyment of nature, as well as a gathering place for activities.

Other Arboretum sites, known as natural areas, allow the visitor to gain an appreciation of completely natural habitats. From sandy hills and open longleaf pine woodlands to slash pine savannas and exotic pitcher plant bogs, the fire-maintained communities provide a vigorous and ever-changing display of wildflowers. In contrast, the old-growth of cypress swamps, bottomlands and beech-magnolia forests protects flowers and wildlife rarely seen. Carnivorous plants and orchids are commonly found in many of the Arboretum's natural habitats. This vast assemblage of carefully selected and protected natural areas nurtures over 700 species of trees, shrubs, wildflowers and grasses found in the Pearl River Basin of southern Mississippi and southeast Louisiana.

The Arboretum maintains an expanding library, and a quarterly news journal informs members of timely happenings and helps readers gain knowledge of the natural environment. *Arboreports* are short, serial reports on sharply focused topics which include garden concept, resource management, environmental issues and scientific research. Special publications include the Native Plant Series consisting of the *Checklist of the Woody Plant Species of the Pearl River Drainage Basin* and the *Guide to the Natural Areas of The Crosby Arboretum.*

The Arboretum Gift Shop offers objects created by regional artisans including pottery and pine needle baskets and other articles relating to botanical themes.

Educational programs focus upon the arts, sciences and the humanities. The Arboretum also provides mini-grants to aid teachers in developing programs that will enhance their students' opportunities to learn about and experience the natural world.

The Crosby Arboretum is founded on the philosophy that plants are more than attractive features of our landscape; plants are an integral part of the environment; our own survival will be threatened if they do not flourish. Therefore, mankind's best interests can be served by the study of our plant neighbors with which we share this planet.

For more information contact:

The Crosby Arboretum
1801 Goodyear Boulevard
Picayune, MS 39466
(601) 798-6961

Restored Prairies Of The University Of Wisconsin-Madison Arboretum

Virginia M. Kline

Prairie wildflowers abound in the restored prairies of the University of Wisconsin-Madison Arboretum and are easily observed from the firelanes and walking trails. Here plants with unfamiliar names such as rattlesnake master (*Eryngium yuccifolium*), prairie dock (*Silphium terebinthinaceum*) and prairie gayfeather (*Liatris pycnostachya*) grow among big and little bluestem (*Andropogon gerardi* and *Schizachyrium scoparium),* prairie dropseed (*Sporobolis heterolepis*), Indian grass (*Sorghastrum nutans*) and other prairie grasses much as they did when the first settlers arrived here 150 years ago.

There are over 300 plant species in Curtis Prairie and Henry Greene Prairie, the largest of the Arboretum's restored prairies. Curtis Prairie (60 acres) is the oldest restored tallgrass prairie in the world. Once cropland, it was a horse pasture when acquired by the Arboretum in 1933. Planting of prairie sods, seedling transplants and seeds was accomplished with the help of Civilian Conservation Corps (CCC) labor in the late 1930's. This is the site where some of the earliest prescribed burning experiments were carried out, which

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Virginia Kline *is staff ecologist and research program manager at the University of Wisconsin Arboretum. She is a community ecologist who received her Ph.D. in botany from the University of Wisconsin-Madison in 1976. Much of her research relates to the restoration and management of natural communities. For the past 11 years she has coordinated research at the Arboretum and has been responsible for planning and evaluating the management of the Arboretum's collection of biotic communities.*

lemonstrated the beneficial effects of fire and aid the groundwork for the widely adopted prescribed burn practices of today.

Henry Greene Prairie (40 acres) was named for the botanist who almost singlehandedly planted the prairie, most of it between 1945 and 1952. While Curtis Prairie is on silt loam soils, the soils in Greene Prairie are sandy, varying from very dry to wet, or poorly drained clay. This provides habitat for many species that do not grow in Curtis Prairie.

The 40 acre Henry Greene Prairie at the University of Wisconsin-Madison is filled with many different grasses. Here the large leaves of prairie dock, Silphium terebinthinaceum, *stand above the grasses.*

The objective of the Arboretum prairie restoration is to re-create a small sample of the once widespread but now rare prairie community, for use in teaching and research. It is a complex community of plants and animals, and attempting to put the parts together has led to greater understanding of the interactions of the plants and animals and their environment.

Prairies are dominated by grasses, and more than a dozen species of grass can be found in the Arboretum prairies. Tallest and most characteristic of the tallgrass prairies is big bluestem or turkeyfoot grass. On the deep silt loams of Curtis Prairie it grows eight feet or more in a good year after a spring burn. Other tall species include Indian grass and switch grass (*Panicum virgatum*), and, on wetter soils, bluejoint grass (*Calamagrostis canadensis*) and cordgrass (*Spartina pectinata*). Perhaps more suitable for most prairie gardens are the shorter species, including little bluestem, prairie dropseed, sideoats grama grass (*Bouteloua curtipendula*) and the small panic grasses (for example, *Dichanthelium leibergii* and *D. oligosanthes*).

Interspersed among the grasses are species of many other families, composites and legumes being particularly well represented. All are adapted to drought, wind and high light intensity. The plants grow close together, with as many as ten different species in a square yard. Flowering is staggered among the species, so that the prairie changes in aspect as the season progresses and there is always something in flower. In general shorter plants flower early and tall plants later. The seedheads of those that have matured and the foliage of those yet to flower add interest and diversity.

Prairies require no fertilization or irrigation, but burning is essential. Each Arboretum

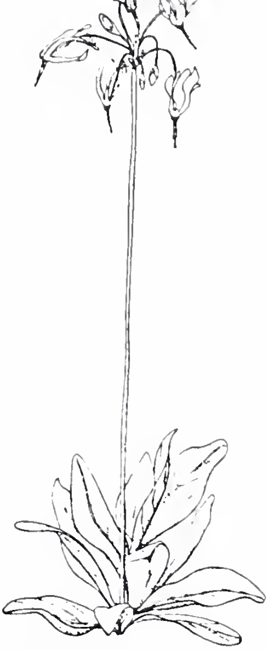
Early spring burning of the prairies stimulates growth and flowering of the grasses and many wildflowers. Among them are shooting stars, Dodecatheon meadia, *with their gracefully reflexed petals, the flowers held high above the basal rosettes of leaves.*

prairie is generally burned (twice) in a three or four year period, usually in early spring when the plants are dormant. Early spring burns stimulate growth and flowering of the grasses and many of the wildflowers, so the prairies are most showy the year of a spring burn.

Among the earliest flowers in spring are pasqueflower (*Pulsatilla patens*, formerly *Anemone patens*) and bird's foot violet (*Viola pedata*), which grow in dry sandy soil. Soon to follow are prairie smoke (*Geum triflorum*), with its unusual closed red flowers and rosettes of hairy, dissected leaves, the blue spikes of lupine (*Lupinus perennis*) and the pink and white shooting stars (*Dodecatheon meadia*) with their gracefully reflexed petals, the flowers held high above the basal rosette of ephemeral leaves.

Early summer brings tall white wild indigo (*Baptisia lactea*, formerly *B. leucantha*) and other legumes: leadplant (*Amorpha canescens*) with attractive gray foliage and small purple flowers, and the prairie clovers (*Dalea purpurea* and *D. candida*—both of these were formerly in the genus *Petalostemum*) with short spikes of magenta or white flowers held above finely divided leaves. Butterflyweed (*Asclepias tuberosa*) adds a splash of intense orange. In July the open clusters of small, pure white flowers of flowering spurge (*Euphorbia corollata*) appear; their delicate texture will enhance the prairie for many weeks. Rattlesnake master, a strange plant with leaves like a yucca and tight spherical heads of greenish white flowers also begins to flower in July.

The big show of composites begins with pale purple coneflower (*Echinacea pallida*) and early sunflower (*Heliopsis helianthoides*), to be followed later in summer by yellow coneflower (*Ratibida pinnata*), vivid magenta spikes of gayfeather, and the tall stalks of yellow sunflowerlike heads of com-



odecatheon meadia

(shooting star)

Compass plant, Silphium laciniatum, *is a composite which produces blooms of yellow sunflowerlike heads on tall stalks. They appear later in the summer.*

pass plant (*Silphium laciniatum*), and prairie dock. The huge basal leaves of both compass plant and prairie dock tend to be oriented so that the narrow edges face the noon sun, thus avoiding direct sunlight at the hottest time of day. Their size, shape and orientation make the leaves conspicuous in the prairie throughout the summer.

Ten species of asters, such as smooth aster (*Aster laevis*) and New England aster (*A. novae-angliae*), and seven species of goldenrod, including stiff goldenrod (*Solidago rigida*) with its flat-topped inflorescence, and showy goldenrod (*S. speciosa*) with its spikelike one, are conspicuous composites in late summer and fall.

While individual species are interesting, and many (including those mentioned here) can be grown in the garden, it is the combinations of grasses and forbs, varying in space and time, that give the prairie its distinctive appeal. Walking the trails through the Arboretum prairies, visitors are given a chance to observe and enjoy many of these combinations, which may provide inspiration for natural landscape plantings and prairie gardens.

The University of Wisconsin-Madison Arboretum is unique in its emphasis on restoration of native communities. Although there is a 60-acre horticultural area, the Longenecker Garden, with an outstanding display of lilacs and flowering crabapples, most of the 1,280-acre site is used for the development of examples of the different types of forests, savannas, prairies and wetlands that were present in presettlement Wisconsin. These areas are used for teaching and research, with special emphasis on the restoration process. Free public tours are given on weekends. During the summer months, the prairies are highlighted. Group tours can be arranged. Maps and information are available at the McKay Center in the Arboretum. ❀

For more information contact: The University of Wisconsin-Madison Aboretum
1207 Seminole Highway
Madison, WI 53711
(608) 262-2746

The Arboretum at Flagstaff

Arizona

Wayne A. Hite

The Arboretum, with its wondrous view of the imposing San Francisco Peaks, was established in 1981 as a center for native plant research and exhibition. Located just outside Flagstaff, Arizona, The Arboretum occupies 200 acres of ponderosa pine forest land at an elevation of 7,150 feet. At The Arboretum you see a fascinating diversity of plants native to alpine tundra, coniferous forest and high desert. The Arboretum is also involved in a nationwide program for conservation of threatened and endangered plants.

The northern Arizona climate is a challenge for local growers. The area is characterized by spring droughts, summer rains and cold, snowy winters. The site can experience a frost during 11 months of the year. The humidity is quite low each day. These climatic conditions have made it difficult to grow many of the widely cultivated species of plants.

At The Arboretum, we are promoting many native shrubs and herbaceous plants and now a number of regional nurseries offer these to gardeners. Of particular note are the many species of penstemons *(Penstemon* spp.*)* and columbines *(Aquilegia* spp.*)*. Found throughout the 170,000-square-mile Colorado Plateau, these hardy species offer a wide variety of flower colors and plant sizes.

We've also introduced gardeners to the local ground cover, pussytoes *(Antennaria* spp.*)*. Low-growing, gray-green-leaved perennials, these species are well adapted to the

The Arboretum occupies 200 acres of ponderosa pine forest land at an elevation of 7,150 feet. There is a fascinating diversity of plants native to the alpine tundra, coniferous forest and high desert.

***Wayne Hite** has bachelor and masters degrees in forest ecology. He worked in forest land management, planning and research prior to becoming the executive director of The Arboretum at Flagstaff in 1985.*

ntense sunlight, extreme temperature ranges nd low annual precipitation of northern rizona.

Endangered plants are mixed into the plantngs on the grounds. They include shrubs such s Arizona cliff-rose *(Cowania subintegra)* nd Arizona willow *(Salix arizonica)* and erbs exemplified by Goodings onion *Allium goodingii)* and San Francisco peaks groudsel *(Senecio franciscanus)*.

The Arboretum at Flagstaff is a unique nstitution located at the crossroads of many nteresting vegetation types that typify the igh elevation and dry environments of the American West.

The Arboretum reaches schoolchildren, gardeners and scientists through educational programs. Large-scale comunity events are scheduled during the summer to teach people about the value of resource conservation and the richness of the Colorado Plateau flora.

The Arboretum is open Monday through Friday, 10 a.m. to 3 p.m. year-round and on Saturdays in June, July and August. ❖

For more information contact:

The Arboretum at Flagstaff
P.O. Box 670
Flagstaff, AZ 86002
(602) 774-1441

National Wildflower Research Center

Beth Anderson

Lady Bird Johnson and a corps of concerned citizens created the National Wildflower Research Center in response to a growing awareness that our native vegetation was rapidly disappearing from the American landscape. The inaugural gift establishing the Center came from Mrs. Johnson in the form of $125,000, and sixty acres of land on the Colorado River near Austin, Texas. The Center is now nationally based, with a membership of nearly 14,000.

The Wildflower Center is dedicated to promoting the preservation, conservation and increased use of wildflowers and native plants. The Center's primary focus is on research and education. Of the some 20,000 species of flowering plants in North America, only a fraction have been studied in depth. Landscaping success with wildflowers and native plants is not always predictable, as so little is known about their cultivation and management. More research is needed. Through experiments on native plants, at the Center and in cooperative projects across the country, a database of information is being established. By studying the growth habits and requirements of our native species we can learn more about how to use them in commercial and residential landscapes.

The need for reliable information about wildflowers and native plants is of the utmost importance. The Wildflower Center's Clearinghouse is working to fill this need. The Clearinghouse serves as a network to join individuals and organizations working with native plants, by gathering up-to-date information on current research and wildflower projects in each state. This information is compiled into fact sheets on seed sources, recommended species, appropriate planting procedures for different regions of the country and additional resources for wildflower information. The Clearinghouse contains an impressive technical library and an extensive slide collection.

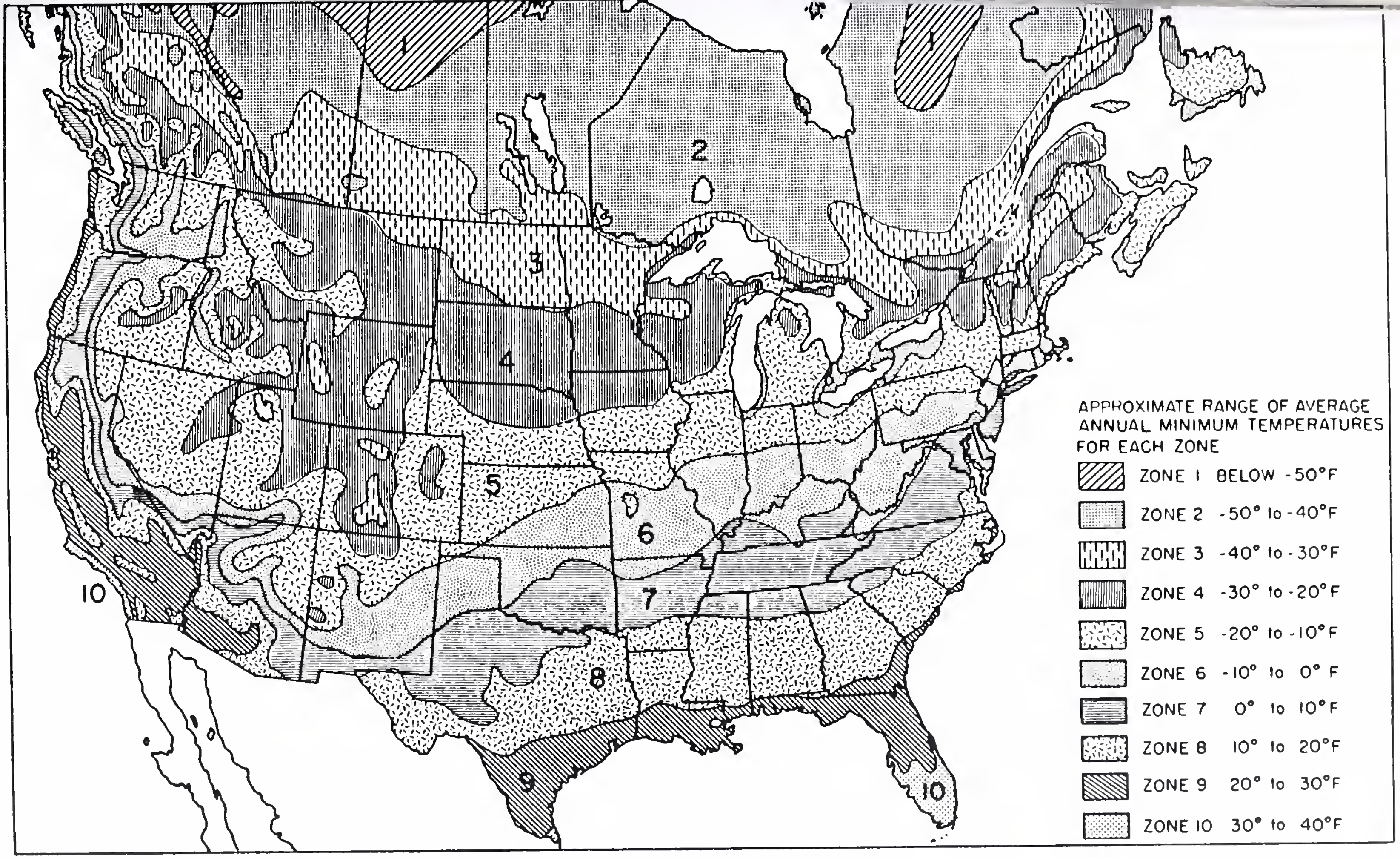
The Wildflower Center is working to preserve America's rich heritage of wildflowers and native plants. Increasing the use of hardy, drought-resistant, indigenous native plant species will allow us to have the best of all worlds. We can enjoy our landscaped areas; we can protect our water supply; we can increase ecological stability; and we can preserve the genetic information essential to the continued existence of native plants and our future utilization of them. Using native plants indigenous to a particular area also helps "each state to speak in its own regional accents," as Mrs. Johnson says.

In our efforts to educate the public about the need to protect and conserve this diminishing natural resource, we have developed a strong national membership program. A broad spectrum of professionals, and wildflower and native plant enthusiasts learn more about our native flora through membership in the Wildflower Center. Members receive a newsletter six times a year; a biannual wildflower journal, written for the layman; priority handling of requests for information; reduced rates on educational seminars; and discounts on Center products.

Visitors to the Center can see over 300 labeled species native to the immediate region in designed landscape settings, in naturalistic community groupings—including a small established native prairie—and in more formal display plantings. Our research test plots and a new "Pollinator Garden" are also open. The Wildflower Center has color from late February through November and fact sheets and slide shows are offered year round. Although not a botanic garden in the classical sense, we welcome inquiries, visits and membership.

For more information contact:

National Wildflower Research Center
2600 FM 973 North
Austin, TX 78725
(512) 929-3600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APPROXIMATE RANGE OF AVERAGE ANNUAL MINIMUM TEMPERATURES FOR EACH ZONE
ZONE 1 BELOW -50°F
ZONE 2 -50° to -40°F
ZONE 3 -40° to -30°F
ZONE 4 -30° to -20°F
ZONE 5 -20° to -10°F
ZONE 6 -10° to 0° F
ZONE 7 0° to 10°F
ZONE 8 10° to 20°F
ZONE 9 20° to 30°F
ZONE 10 30° to 40°F

Helpful Lists of Sources of Native Plants

Nursery sources: Native Plants and Wildflowers, 1987, 72 pages.
Compiled by the New England Wild Flower Society, Inc., Garden in the Woods, Hemenway Road, Framingham, MA 01701. Sections include a list of popular native plants and nursery sources; a list of 58 nurseries propagating native plants for Zones 4-6; and a list of other nurseries selling propagated native plants. Available for $4.95. This booklet has been updated on an annual basis.

Sources of Native Seeds and Plants, 1982
Available from the Soil Conservation Society of America, 7515 Northeast Ankeny Road, Ankeny, IA 50021-9764. Single copies $3.50 postpaid. Contains 272 different sources listed by state with comments describing the type of material they offer.

A Source Book of Information on Horticulturally Useful Native or Naturalized Plants of the Southeastern United States, 1985, 87 pages.
James H. Horton, Editor. Prepared and published by Western Carolina University. Sections include: a list of individuals who have expertise in using native plants for beautification; a list of institutions that can serve as resources; a list of sources for native and naturalized species; a habitat key; and a list of references.

Sources of Native Plants and Wildflowers
A three-page list of sources of seed and propagated plants published by the Virginia Native Plant Society. For a copy send a self-addressed stamped envelope to VNPS—Orders, P.O. Box 844, Annandale, VA 22003.

Commercial Seed Sources for Southeastern Native Plants
A one-page list of sources that offer propagated plants native to the southeastern U.S. Published by the North Carolina Botanic Garden, UNC-CH, Totten Center 457A, Chapel Hill, N 27514.

Typha latifolia *(cattai*

Source List of Native Plants
A list of addresses of Western nurseries available from the Native Plant Society of New Mexico, P.O. Box 5917, Santa Fe, NM 87502. Send a self-addressed stamped envelope.

Some Sources of Plant Material Indigenou to Pinelands Areas, 1981–1982.
Available for $1.50 from South Jerse Resource Conservation and Developmen Council, P.O. Box 676, Hammonton, N 08037.

Some Sources of Plant Material Native o Adapted to Seashore Conditions, 1981–1982
Same as above.

Texas Native Plant Directories
Contact the Texas Department of Agricultur P.O. Box 12847, Austin, TX 78711.

Andersen Horticultural Library's Source Lis of Plants and Seeds, 1987, 163 pages.
A source list of over 30,000 entries of hard plants (not exclusively native plants) listed b scientific name. Wholesale and mail-orde nurseries are included. Available for $29.9 from: Andersen Horticultural Library, Minnesota Landscape Arboretum, 367 Arboretum Drive, Box 39, Chanhassen, MN 55317.

tive Plant cieties

tional Organizations

tional Wildflower Research Center
00 FM 973 North
stin, TX 78725

eration Wildflower
tional Council of State Garden Clubs
s. C. Norman Collard, Chairman
x 860
casset, MA 02559

il Conservation Society of America
15 Northeast Ankeny Road
keny, IA 50021

e Canadian Wildflower Society
Bauer Crescent
nionville, Ontario L3R 4H3

he Center for Plant Conservation
he Arnold Arboretum
arvard University
he Arborway
maica Plain, MA 02130

he Nature Conservancy
800 North Kent Street, Suite 800
rlington, VA 22209

Gentiana andrewsii *(closed gentian)*

Aster novi-belgii *(aster New York)*

By State

Alabama

Alabama Wildflower Society
c/o George Wood
Route 2, Box 115
Northport, AL 35476

Alaska

Alaska Native Plant Society
P.O. Box 141613
Anchorage, AK 99514

Arizona

Arizona Native Plant Society
P.O. Box 41206 Sun Station
Tucson, AZ 85717

Arkansas

Arkansas Native Plant Society
c/o Mr. Don Peach
Route 1, Box 282
Mena, AR 71953

California

California Botanical Society
c/o Department of Botany
University of California
Berkeley, CA 94720

California Native Plant Society
909 12th Street, Suite 116
Sacramento, CA 95814
California Native Plant Society Chapters:
Bristlecone (Inyo-Mono Region)
Channel Islands
Dorothy King Young (Coast from Jenner to Ft. Bragg)
Kerr County
Marin
Milo Baker (Santa Rosa)
Monterey Bay
Mount Lassen
Napa Valley
North Coast
Northern San Joaquin Valley
Orange County
Riverside/San Bernadino Counties
Sacramento Valley
San Diego
San Francisco Bay
Sanhedrin (Ukiah)
San Luis Obispo County
Santa Clara Valley
Santa Cruz County
Santa Monica Mountains
Sequoia (Fresno)
Shasta
South Coast
Tahoe

National Alliance for Plants
c/o Alice Q. Howard
6415 Regent Street
Oakland, CA 94618
To improve rare plant protection.

Save-the-Redwoods League
114 Sansome Street, Room 605
San Francisco, CA 94104

Colorado
Colorado Native Plant Society
Box 200
Fort Collins, CO 80522

Connecticut
Connecticut Botanical Society
c/o Donald Swan
1 Livermore Trail
Killingworth, CT 06417

District of Columbia
Botanical Society of Washington
Department of Biology — NHB/166
Smithsonian Institution
Washington, DC 20560

Florida
Florida Native Plant Society
1203 Orange Avene
Winter Park, FL 32789
Florida Native Plant Society Chapters:
Big Pine Key
Central Florida
Coccoloba (N. Fort Myers)
Dade
Heartland (Hardee, Polk, Highland Counties)
Magnolia (Tallahassee)
Martin County
Naples
Palm Beach
South Brevard
Suncoast (Tampa Bay)

Pensacola Wildflower Society
c/o Jim Dyehouse
3911 Dunwoody Drive
Pensacola, FL 32503

Georgia
Georgia Botanical Society
c/o Dr. Frank McCamey, Treasurer
1676 Andover Court
Doraville, GA 30360

Hawaii
Hawaiian Botanical Society
c/o Department of Botany
University of Hawaii
3190 Maile Way
Honolulu, HI 96822

Idaho
Idaho Native Plant Society
USDA — Forest Service
Intermountain Forest and Range Experiment Station
316 East Myrtle Street
Boise, ID 83706

Illinois
Illinois Native Plant Society
Department of Botany
Southern Illinois University
Carbondale, IL 62901

Indiana
Assoc. for the Use of Native Vegetation in Landscape through Education
(A.N.V.I.L.)
871 Shawnee Avenue
Lafayette, IN 47905

insas

insas Wildflower Society
ulvane Art Center
ashburn University
'th & Jewell Street
opeka, KS 66621

rassland Heritage Foundation
450 Buena Vista
awnee Mission, KS 66205
To encourage the preservation of native prairie and the use of native vegetation in the landscape.)

ave the Tallgrass Prairie, Inc.
101 West 54th Terrace
hawnee Mission, KS 66025
To protect a portion of the tallgrass prairie within the National Parks.)

ouisiana

ouisiana Native Plant Society
/o Richard Johnson
Route 1, Box 151
Saline, LA 71070
Louisiana Native Plant Society Chapters:
Acadian
Alexandria
Natchitoches
Ruston

Greater New Orleans Native Plant Society
Mr. David Heikamp
717 Guiffias Avenue
Metairie, LA 70001

Northwest Louisiana Native Plant Society
Mrs. Karlene Defatta
Route 2, Box 54-C
Keithville, LA 71047

Maine

Josselyn Botanical Society
c/o Dr. Charles D. Richards, President
Deering Hall
University of Maine
Orono, ME 04469

Maryland

Chesapeake Audubon Society
Rare Plant Committee
P.O. Box 3173
Baltimore, MD 21228

Maryland Native Plant Society
c/o Scaffidi
14720 Claude Lane
Silver Spring, MD 20904

Massachusetts

New England Botanical Club
Botanical Museums Avenue
Oxford Street
Cambridge, MA 02138

New England Wild Flower Society, Inc.
Garden in the Woods
Hemenway Road
Framingham, MA 01701

Michigan

Michigan Botanical Club
Matthaei Botanical Gardens
1800 Dixboro Road
Ann Arbor, MI 48105

Minnesota

Minnesota Native Plant Society
220 BioSci Center
University of Minnesota
1445 Gortner Avenue
St. Paul, MN 55108

Mississippi

Mississippi Native Plant Society
c/o Travis Salley, Secretary
202 N. Andrews Avenue
Cleveland, MS 38732

Missouri

Missouri Native Plant Society
Box 6612
Jefferson City, MO 65102-6612

Nevada

Northern Nevada Native Plant Society
Box 8965
Reno, NV 89507

New Jersey

New Jersey Native Plant Society
c/o Frelinghuysen Arboretum
Box 1295R
Morristown, NJ 07960

New Mexico

Native Plant Society of New Mexico
P.O. Box 5917
Santa Fe, NM 87502

New York

Syracuse Botanical Club
Janet Holmes
306 Cleveland Boulevard
Fayetteville, NY 13066

Torrey Botanical Club
New York Botanical Garden
Bronx, NY 10458

North Carolina

North Carolina Wildflower Preservation Society
c/o North Carolina Botanical Garden
UNC-CH Totten Center 457-A
Chapel Hill, NC 27514

Western Carolina Botanical Club
Richard M. Smith, President
Tinequa Drive
Connestee Falls
Brevard, NC 28712

Ohio

Cincinnati Wildflower Preservation Society
c/o Dr. Victor G. Soukup
Department of Biology
University of Cincinnati
Cincinnati, OH 45221

Ohio Native Plant Society
c/o Ann Malmquist, President
6 Louise Drive
Chagrin Falls, OH 44022

Oregon

Native Plant Society of Oregon
c/o Dr. Frank A. Lang
Department of Biology
Southern Oregon State College
Ashland, OR 97520

Pennsylvania

Botanical Society of Pittsburgh
c/o Mr. Robert F. Bahl
401 Clearview Avenue
Pittsburgh, PA 15205

Muhlenberg Botanical Society
c/o North Museum
Franklin and Marshall College
Lancaster, PA 17604

Pennsylvania Native Plant Society
1806 Commonwealth Building
316 Fourth Avenue
Pittsburgh, PA 15222

Philadelphia Botanical Club
Academy of Natural Sciences
19th and the Parkway
Philadelphia, PA 19103

Tennessee

Tenneessee Native Plant Society
c/o Department of Botany
University of Tennessee
Knoxville, TN 37916

Texas

Big Thicket Association
Box 198
Saratoga, TX 77585
(To promote the preservation of the area of Southwest Texas known as the Big Thicket.)

Native Plant Society of Texas
P.O. Box 23836—TWU Station
Denton, TX 76204

Utah

Utah Native Plant Society
c/o The State Arboretum of Utah
University of Utah, Building 436
Salt Lake City, UT 84112

Virginia

Virginia Native Plant Society
P.O. Box 844
Annandale, VA 22003
Virginia Wildflower Preservation Society Chapters:
Blue Ridge, Roanoke
Jefferson, Charlottesville
John Clayton, Williamsburg
Piedmont, Warrenton
Pocahontas, Richmond
Potowmack, McLean
Prince William, Manassas
Shenandoah, Harrisonburg

Washington

Washington Native Plant Society
c/o Dr. Arthur R. Kruckeberg
Department of Botany
University of Washington
Seattle, WA 98195

Abundant Life Seed Foundation
Box 772, 1029 Lawrence
Gardiner, WA 98334
(To propagate and preserve native plants of the North Pacific Coast with emphasis on rare and endangered species.)

West Virginia

West Virginia Native Plant Society
Herbarium, Brooks Hall
West Virginia University
Morgantown, WV 26506

Wyoming

Wyoming Native Plant Society
P.O.Box 1471PntSociety
P.O. Box 1471
Cheyenne, WY 82001

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ARDENING WITH WILDFLOWERS
NATIVE PLANTS

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GARDENING WITH WILDFLOWERS & NATIVE PLANTS

1990

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PLANTS & GARDENS
BROOKLYN BOTANIC GARDEN RECORD

GARDENING WITH WILDFLOWERS & NATIVE PLANTS

THIS HANDBOOK IS A REVISED EDITION OF PLANTS & GARDENS, VOL. 45, NO. 1

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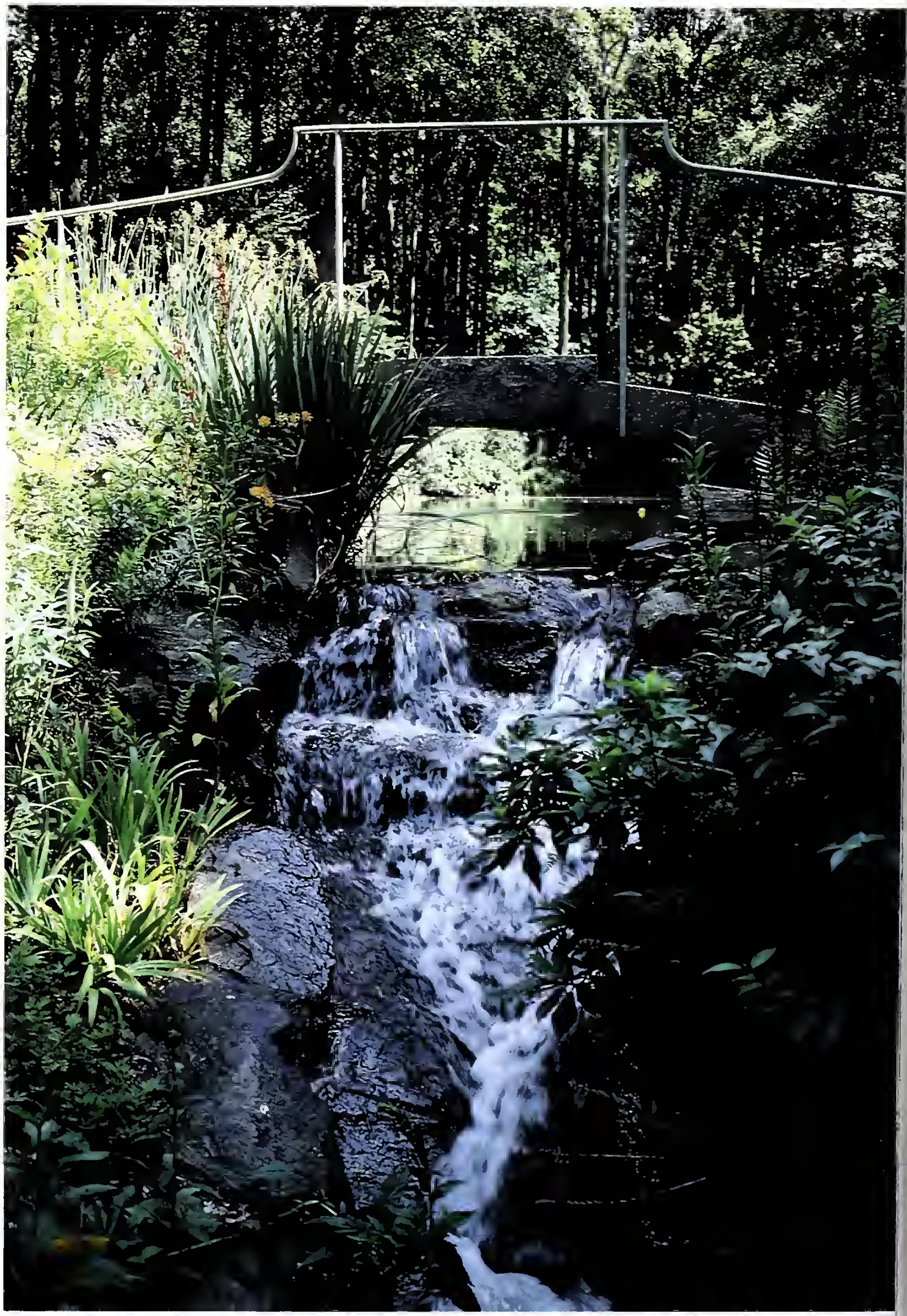


A naturalistic setting at the Mt. Cuba Center in Greenville, Delaware.

NOTE FROM THE GUEST EDITOR

There are a few things you should know before you start reading the wealth of information about American native plants found between these covers. First, the basic reference used for scientific names is *A Synonymized Checklist of the Vascular Flora of he United States, Canada and Greenland.* Produced by John and Rosemarie Kartesz, t was published in 1980 by the University of North Carolina Press. Dr. Ritchie Bell, who has contributed to this handbook, assisted with the checklist. It is the most recent and comprehensive accounting of North American plant species.

Second, some of the plant combinations offered in the articles here include exotic plants. Throughout the handbook, an exotic is defined as any plant not native to he U.S., and is identified by an asterisk (*) following its name.

Third, the hardiness zones referred to hroughout the handbook are those of the USDA Plant Hardiness Zone Map, as shown on page 91.

One other thing I'd like to add: In 851, Andrew Jackson Downing wrote:

> *Nothing strikes foreign horticulturists and amateurs so much as this apathy and indifference of Americans to the beautiful sylvan and floral products of their own country. An enthusiastic collector in Belgium first made us keenly sensible of this condition of our countrymen, last summer, in describing the difficulty he had in procuring from any of his correspondents here, American seeds or plants, even of well known and tolerably abundant species, by telling us that amateurs and nurserymen who annually import from him every new and rare exotic that the richest collections of Europe possessed, could scarcely be prevailed upon to make a search for native American plants, far more beautiful, which grow in the woods not ten miles from their own doors. Some of them were wholly ignorant of such plants, except so far as a familiarity with their names in the books may be called and acquaintance. Others knew them, but considered them 'wild plants,' and therefore, too little deserving of attention to be worth the trouble of collecting, even for curious foreigners. 'And so,' he continued 'in a country of azaleas, kalmias, rhododendrons, cypripediums, magnolias and nyssas—the loveliest flowers, shrubs, and trees of temperate climates—you never put them in your gardens, but send over the water every year for thousands of dollars worth of English larches and Dutch hyacinths. Voilà le goût Republicain!'**

Sadly, while Downing was tremendously influential regarding garden design, this quote could have been written yesterday (except perhaps for the dated writing style). It is my hope that the contributors who wrote passionately for this handbook will inspire you to plant some of "the loveliest flowers, shrubs and trees of temperate climates" in your garden.

CLAIRE SAWYERS *is administrative assistant/acting urator at Mt. Cuba Center in Greenville, DE, where he has learned much about native plants. She is free-ance garden writer and a regional director of the Garden Writers of America Association (1989-1991). he holds masters degrees in plant science from Purdue University and the University of Delaware. She was uest editor of* ***Plants & Gardens*** *handbooks* ***Japanese Gardens (1985)*** *and* ***American Gardens: A Traveler's Guide (1986).***

* Quoted from *Rural Essays* first written for the *Horticulturist* and later collected by George William Curtis and published in book form in 1851.

Illustration by Nettie S. Smit

WHY NATIVE PLANTS

HARRISON L. FLINT

The following address was made at the 1986 Longwood Graduate Program Seminar.

Before considering why we should use native plants in landscaping, we need to consider the more important question: Why should we preserve native plants?

Reasons for preserving native plants fall into two general categories:

ECOLOGICAL REASONS have to do with how plants function in ecosystems. Extinction, the ultimate catastrophe for a species, is a one-way passage. Species are products of thousands or even millions of years of evolution. Once they are lost, replacement is so slow that, in the human time scale, it does not happen. There are other catastrophes as well. Ecosystems depend not just on the survival of a few remaining individuals, but on adequate numbers for interaction within the ecosystem. Rarely if ever do we know what population level is necessary, but our knowledge of ecosystems tells us there must be a level for each species. Moreover, survival of a species, especially in capricious climates, depends on maintaining a broad level of variation in the gene pool. So the population of a rare species in more important not just for the functioning of the ecosystem, but for the survival of the species itself.

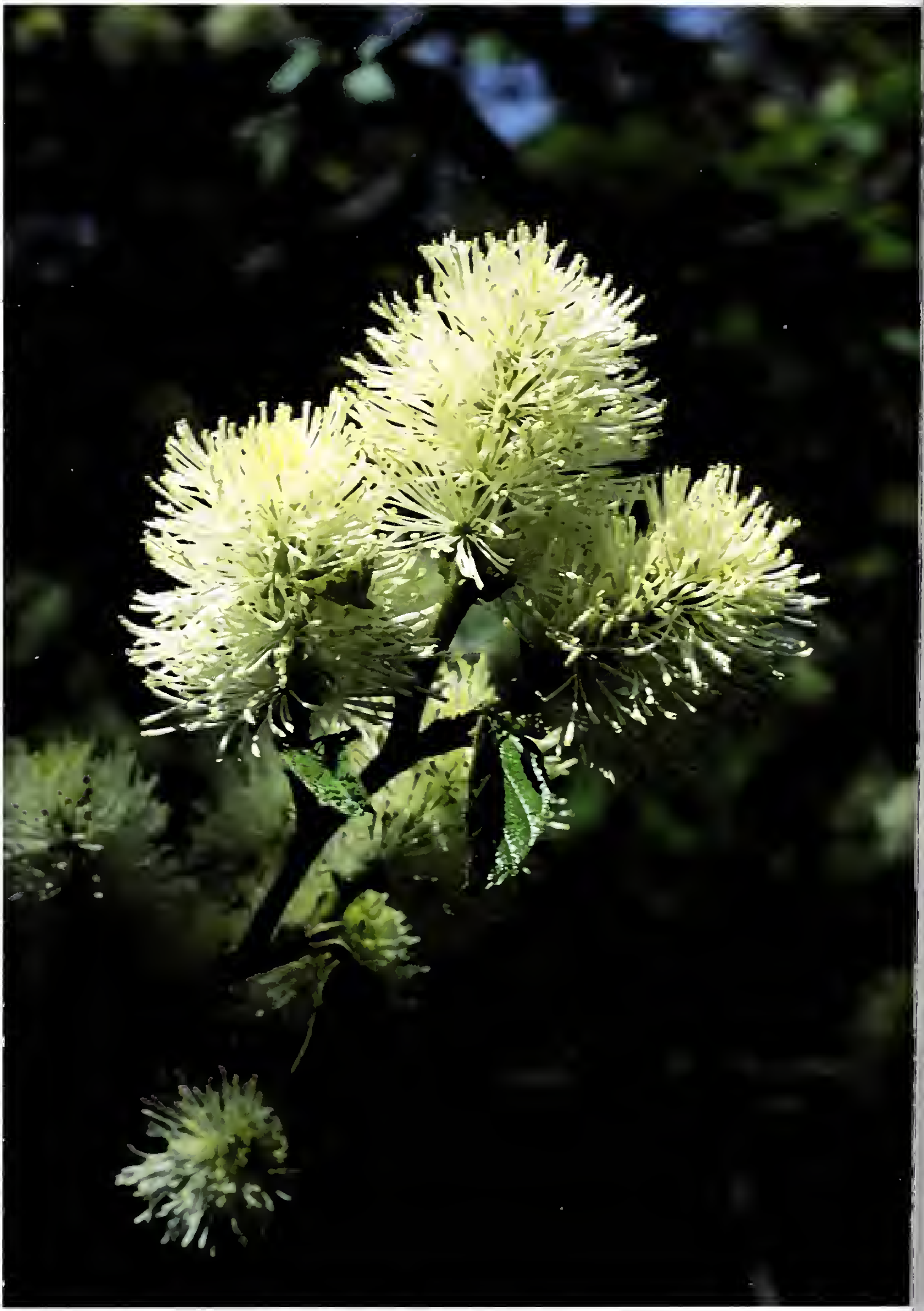
HUMAN REASONS, Homo sapiens, the species we belong to, is a strange member of our ecosystem, although we may not acknowledge or even recognize the fact. Our dependence on plant species for food, shelter and medicine is well known. We are also gripped by a psychic dependence on plants which make our surroundings familiar to us. In doing so, they give us a sense of protection, comfort, peace, and even inspiration. In the richness of their diversity they contribute to our human delight.

There are many different ways to use native plants. The most complex way is to reconstruct a plant community, or a significant part of one. The least complex is merely an "affirmative action" program to include more of the best native plants in nursery lists and in the palettes of landscape designers.

Efforts to promote the use of native plants have been going on for a long time

---

HARRISON L. FLINT *has taught at Purdue University in the area of woody landscape plants since 1968. At Purdue, he initiated the Professional Plantsman Program for students pursuing careers in botanical gardens and related institutions. Professor Flint has authored many popular and scientific articles and two books.* ***Landscape Plants for Eastern North America*** *has received two national awards. His* ***The Country Journal Book of Hardy Trees and Shrubs*** *describes landscape plants for cold climates.*



Close-up view of the flowers of *Fothergilla major*. The flower clusters are upright with a bottlebrush shape. They appear as the leaves are unfolding.

n the Midwest, with the activities of ioneers like O.C. Simonds, who is often hough of as the father of the movement, nd Jens Jensen, no purist in the use of ative plants, yet a tremendous influence hrough his sensitive creation of landscapes hat emulate nature. Another pioneer was he great communicator, May Theilgaard Watts. Her lifetime of teaching and writing bout nature and natural landscapes at the Morton Arboretum, well sampled in her ook, *Reading The Landscape*, educated everal generations and set the stage for Ray Schulenberg's work in prairie estoration at the same institution.

Restoring Native Plant Communities

The complexity of most ecosystems, with heir full range of plants, animals and micro-flora, makes full restoration practically impossible. The most ambitious efforts to date have included partly reconstructed communities of plants and animals. More often, restoration of native landscapes has been limited to most or part of the higher plant complement — overstory and understory trees, shrubs, and ground covers. Interest in this approach is increasing, and a growing number of landscape architects in this country and others are now devoting much of their time to constructing landscapes with native communities.

According to practitioners, reconstructed native plant communities offer specific advantages:

Regional uniqueness. Native plant communities preserve in a region a *genius loci*, or pervading spirit that makes each place unique, identifiable, familiar and comfortable to its residents. When finished, a constructed landscape that emulates nature may once again express those qualities which first attracted us to the natural landscape.

Integrity. With nature as inspiration, native plant communities give a feeling of wholeness and inherent compatibility. Such landscapes are in tune with seasonal changes of land and climate, and express this visually by their own seasonal changes. They serve as extensions of the greater landscape.

Educational and recreational value. Living within a native plant community offers endless opportunities for observation of nature, with its attendant educational and recreational benefits. Our psychic roots draw us to nature, even when we resist. We sense that interaction with plant life can greatly ameliorate stress.

Using Native Plants in Mixed Landscapes

Native plant communities are useful in many types of landscapes, including urban sites. Yet in some situations their use is difficult or even impossible. Even when native communities cannot be reintroduced, native species are still useful. Their best use in such situations may be in artificial but visually compatible groupings, combined with non-native species that are fitted to the site because of adaptation to similar conditions in other parts of the world where they have evolved.

In mixed (native and non-native) landscapes, we attempt to imitate or even step beyond nature's exemplary combining of plant species. In selecting plant combinations, we set out to achieve in a mortal life span what has taken nature thousands of years to accomplish. If we recognize that we are doing this, we may assume an attitude of humility that will allow us to create landscapes, yet maintain a proper sense of generosity toward nature. It seems ethically essential that we give our first attention to nature itself, by conserving natural ecosystems, before turning to our constructed gardens and landscapes. This is a lesson we largely have yet to learn but I think we are making progress.

ILLUSTRATION BY NETTIE S. SMITH

THE SOURCE OF OUR WILDFLOWERS

The Modern Flora of North America

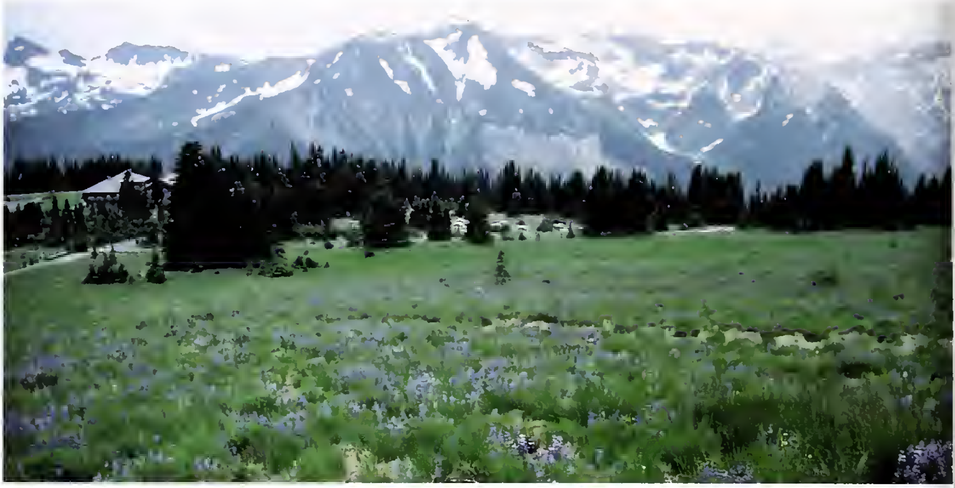
C. Ritchie Bell

When we garden with native and naturalized wildflowers, we garden not only with nature but also with history. Since many of our showy wildflowers have been of medicinal, economic or other importance in earlier cultures, the historical aspect often adds further insight and enjoyment to our gardening efforts.

Many of the *native* plants among the wildflowers in our gardens today are a part of the vast array of strange, useful and beautiful plants of the "new world" that provided the early European explorers and settlers with the food, fuel, shelter and medicines necessary for survival. Other wildflowers we grow may actually be colorful plants from other lands that have been introduced into America and naturalized — that is, they grow wild, they thrive and spread without human help. A current printout from the extensive computerized Kartesz database for North American plants at the North Carolina Botanical Garden shows almost 3,000 species, or about 16% of our total flora of some 18,000 species, to be introduced. Perhaps, when our records are complete, we will find that about half of these introduced plants are now truly naturalized while others may only be waifs or rare escapes from cultivation that do not survive without human care.

Some of our naturalized plants are so prolific and so adaptable biologically that, despite their interest, beauty or fragrance, they are often considered to be weeds! The dandelion (*Taraxacum officinale*, from Europe), Queen Anne's Lace (*Daucus carota*, from the Afghanistan area by way of Europe) and Japanese honeysuckle (*Lonicera japonica*, from Japan) are good examples of introduced plants that have become weedy. However, even though considered weeds in many situations, these plants may still have a valid place in a wildflower garden if they are appropriately confined.

C. Richie Bell, *professor of botany and, for 25 years (1960-1985), director of the North Carolina Botanical Garden, is active in public education and conservation concerning our native plants. He wrote North Carolina's current plant protection law; and was co-author of the* ***Manual of the Vascular Flora of the Carolinas*** *and two popular books:* ***Wild Flowers of North Carolina*** *and* ***Florida Wild Flowers and Roadside Plants****. He received the 1979 National Council of Garden Clubs Silver Seal Award for work in conservation.*



Mt. Rainer provides a panoramic backdrop for a field of lupines in the foreground. Native species will do best in the garden with conditions similar to their native habitat.

Maine's Isle-aux-Haut has its own unique set of environmental factors that play a essential part in the forming plant communities found there.

Not all weeds, however, are introduced plants. With the clearing of the forests over the past three centuries and the disruption of the stable, mature or climax plant communities, quite a few native American plants, such as the blackberries (*Rubus* spp.), poison oak and ivy (*Toxicodendron* spp.), wild onions (*Allium* spp.) an even cattails (*Typha* spp.) have sprea rapidly and become terrestrial or aquati weeds in many areas. Indeed, if we defin a weed as "any plant growing out of place

West Virginia's forests are mixed Southeastern forests. In many areas where logging has cleared the land second- and third-growth pines have replaced the hardwoods.

we can see why some attractive but prolific native plants, such as the rhizomatous wild ginger (*Asarum canadense*) or the common blue violet (*Viola priceana*), or even the beautiful New England aster (*Aster novae-angliae*) and cardinal flower (*Lobelia cardinalis*) can, without some control, become a weed in our wildflower garden. Thus the term "weed" and "wildflower" can only be defined in specific contexts and through the eyes of the beholder. For example: little bellwort (*Uvularia sessilifolia*), a delicate spring ephemeral of the southern Appalachians, is often listed as a desirable perennial for the wildflower garden and, oddly, it is also listed as a weed by the Weed Science Society of America. Indeed, among the nearly 2,000 plants on this subjective and unofficial list, one finds a number of showy natives (the bladderworts, *Utricularia* spp. for instance) that are also on one or more of the various state lists of "rare and endangered" native plants. So don't fear having a few attractive "weeds" in your wildflower garden!

The great diversity of plant life in North America was a source of amazement to early explorers and, of course, reflected the great diversity of climates, soils and local environments within this vast area. Every new range of mountains, every new river valley, and each new strip of coastal dunes or swampland provided new plants of such interest, beauty or utility that fine timber, drugs and plants of horticultural value soon made up many of the cargoes bound for Europe from the Colonies. As these plants from America became established in the gardens of Europe, they confirmed the seemingly outlandish reports of the early explorers who told of huge *evergreen* trees (*Magnolia!*) with fragrant flowers nearly a foot across, or of plants with hollow leaves (*Sarracenia*) that trapped insects, or even of a plant (*Dionaea*) with leaves that moved to trap insects!

Many of the same botanical treasures of America such as foamflower (*Tiarella cordifolia*) and cardinal flower (*Lobelia cardinalis*) that were entering European horticultural circles 200 years ago are often plants we find to be attractive subjects for our wildflower gardens today. However, we must be realistic in our selections from the much larger number of native species now known and available to gardeners. We must keep in mind that certain groups of tree, shrub and herb species are adapted to grow together as a "plant community" under a particular set of environmental conditions (temperature, light, soil, moisture) and will do best in your garden if provided with conditions similar to those of their native habitat.

Most gardeners are familiar with the 10 minimum temperature zones of North America, reproduced in many seed catalogs as the "plant hardiness zone" map (see p. 91 herein), which shows a minimum temperature range from the -40 degrees to -30 degrees F of the sometimes frigid Zone 3 to the usually subtropical 30 degrees to 40 degrees F minimum of Zone 10. These 10 temperature or "climatic zones" overlay a mosaic of a dozen or more different kinds of soil (sand, clay, loam, etc.) which, in turn, may have different altitudes, slopes, acidity or water-holding capacity. As a result of the various combinations of environmental factors we find a corresponding variation in the plant communities. Thus over 100 specialized plant communities, each generally named for the dominant cover plant or plants in the association, have been recognized for North America. The plants of each of these communities are adapted to a specific major climate/soil combination and some of these major plant communities cover, or originally covered, thousands of square miles. Today, however, urban growth, road and highway construction, our agricultural needs, and our need for paper, timber and other forest products have reduced many of these once vast dominant-plant communities to small remnants tucked away here and there protected by concerned groups and individuals as reserves or special conservation areas.

Along the East Coast the major plant communities are forests such as the evergreen Spruce-Fir Community of high altitudes and latitudes, with the Beech-Maple, Mixed Mesophytic and Pine-Oak-Hickory Communities at the lower altitudes and latitudes. However, in many areas second- and third-growth pines have replaced the hardwoods as they have been logged. Some of the smaller, more specialized and often more botanically unique plant communities of the Northeast are such associations as the Pine Barrens of New Jersey, the Cedar Glades of Tennessee, Missouri and Alabama, the Southern Coastal Plain Pocosins, the Southern Cordgrass Prairie and, of course, the Everglades of southern Florida.

In the Great Central Plains, some of the important original grassland associations were: the Bluestem Prairie, Grama-Buffalo Grass and Bluestem-Grama Prairie. Further west we find major areas of the Great Basin Sagebrush Community, Creosote Bush, Mesquite-Acacia Savanna, Palo Verde-Cactus Shrub, and Chaparral Community. Along the West Coast itself some of the major plant communities, again often found now only as protected remnants of once widespread plant-covers types, are the Redwood Forest, Douglas Fir Forest, Juniper-Pinon Woodland, Oak-Juniper Woodland, Coastal Sagebrush, and of course, the grasslands or California Steppe.

Each of the above major plant communities has its own distinctive group of colorful, interesting, annual and perennial herbaceous plants which make excellent choices for wildflower gardens and are often easy to grow in gardens within those regions that provide the soil, moisture and temperature conditions to which the plants are adapted. Within each major plant community are, of course, numerous small and more specialized plant populations and communities specifically adapted to, and often limited to, a relatively infrequent combination of very specific soil, moisture, light and temperature factors. Some of these highly specialized plant communities may be defined primarily by specific soil factors; for example, the Shale Barrens and Diabase Dike communities of the East or the Serpentine communities of the West. Others, such as the plant communities found on the shallow soil of granite outcrops, are adapted to highly acidic pools, seasonally available, on these bare-rock surfaces. Plants of the famous cranberry bogs of the Northeast also thrive in highly acidic, but almost constantly wet, conditions of the sphagnum/peat substrate.

Many beautiful wildflowers of the more highly specialized plant communities are so strongly adapted to the special conditions of these communities that they are found nowhere else. Such plants of specific, usually restricted, habitat and range are referred to as "endemic" plants and, because of their restricted range and generally small population size, may be quite rare. Fortunately, more and more of these rare endemics, determined by botanists to be endangered, are being given legal protection by the Federal and state governments to help save them from extinction by overzealous plant collectors, uncontrolled commercial exploitation, or the thoughtless destruction of their specialized habitats. However, these highly specialized plant communities can still provide many other beautiful wildflowers for those gardens where the specific habitat requirements for such species can be rather closely duplicated.

This prairie at the Shaw Arboretum in St. Louis, Missouri features the native coneflower, *Echinacea purpurea*.

Among our endangered endemics (and the "difficult or impossible to grow" wildflowers) are many species which have, in addition to very specific soil, climate and light requirements for growth, a very complex nutritional association with specific fungi that live in the roots of the plants and actually provide some (or all!) of the food or certain raw materials needed by the host plant to grow, flower and set seed. In many cases, we do not even know the name of the fungus in these intricate symbiotic relationships, let alone what *its* environmental requirements are — and, if the fungus dies, its host dies. This is why the "mycorrhizal plants", such as Indian pipe (*Monotropa*

uniflora), pine-sap (*Monotropa hypopithys*) and snow plant (*Sarcodes sanguinea*) in the Monotropaceae, or Indian Pipe Family; small whorled pogonia (*Isotria medeoloides*), the lady-slippers (*Cypripedium* spp.) and most other members of the Orchidaceae, or Orchid Family, cannot be transplanted and should not be attempted in the wildflower garden. On the other hand, some of our showy and interesting parasitic wildflowers such as Indian paintbrush (*Castilleja* spp.) which is parasitic on the roots of grasses and some shrubs, false foxglove (*Aureolaria*, spp.) parasitic on the roots of oaks and beechdrops (*Epifagus virginiana*), parasitic on the roots of beech can often be grown from seed if you have the appropriate host plant in your garden.

To have a more beautiful, healthy and carefree wildflower garden, learn the lesson of our plant communities. If you live on the seacoast, you should certainly plan a garden of native and naturalized coastal wildflowers (but remember that the plants of the eastern and western seacoasts are certainly quite different!); if you live in the mountains (eastern or western, see above!), put mountain plants in your garden. If, within a given region, your garden has some special environmental condition such as a moist area, a shady area, an open area or specialized soil type, you can almost guarantee success with your wildflower garden by planting each "habitat" with those trees, shrubs or herbs of your region that are naturally adapted to your particular combination of conditions.

Generally, the more widespread a particular plant species, the more generalized are its environmental requirements and the easier it will be to raise in your garden. Conversely, the more geographically or ecologically restricted a plant species, the more specialized and specific are its environmental requirements and the more difficult it may be to grow under other soil, moisture, light or nutritional conditions. Of course, the greater the challenge such plants offer the grower, the greater the satisfaction in growing them and the more valuable the propagation and cultural information derived from the gardener's records of successes and failures in the propagation and establishment of such "difficult" plants in their gardens. ❦

ACQUIRING NATIVE PLANTS

MARY POCKMAN

In choosing plants, gardeners who cherish the plants of wild places add another criterion to the usual emphasis on quality: conservation. We seek to acquire the best garden plants, and to acquire them in ways that respect the integrity of natural communities, in all their beauty and diversity.

The criterion of quality is familiar to all gardeners. Peonies or penstemons, Kurume azaleas or mountain laurels, the plants of choice are always those that in appearance and vigor will add most to the place and special mood that the gardener envisions. By this standard, the plants to select are those intentionally propagated for garden use, something that hardly needs to be said about familiar cultivated plants.

When it comes to wildflowers and other native species, however, intentional propagation cannot be taken for granted. Many if not most of the plants now available have been removed from their wild habitats. Plants dug from the wild are generally much less satisfactory in the garden. Moreover, wild collection for garden use is a dubious practice in terms of conservation. Many native species are already under severe pressure because of shrinking natural habitats and a compromised environment.

To avoid jeopardizing wild populations and yet obtain the highest quality plants, it is best to search out propagated plants and decline those dug from the wild — with the exception of plants removed from sites where they would otherwise be obliterated. Putting this policy into practice is not difficult, but it does require attention and care.

The advantages of propagated plants are clear cut. Unlike plants that have come to maturity in the wild, they have been grown under favorable conditions and protected against serious pests, competition and undue stress. They are thus generally healthier and better looking, with more compact and vigorous root systems. Wild-collected plants often disappoint gardeners by sulking or disappearing completely; propagated plants far more consistently live up to expectations.

The argument against wild collection on grounds of conservation is more complex Horticultural collection is extensive, and i is potentially harmful; that much is clear There is little systematic information, however, about its extent, or, more important its impact. (Much, or even most, wild collection is believed to be illegal, violatin laws regarding theft, trespass or takin

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MARY POCKMAN, *a conservationist and longtime wildflower enthusiast with a weakness for ferns, is past president (1985-1988) of the Virginia Native Plant Society. She began using native species in her own garden in northwest Connecticut in the 1960s. In her present garden, in suburban Washington, D.C., she grows some 70 native species.*

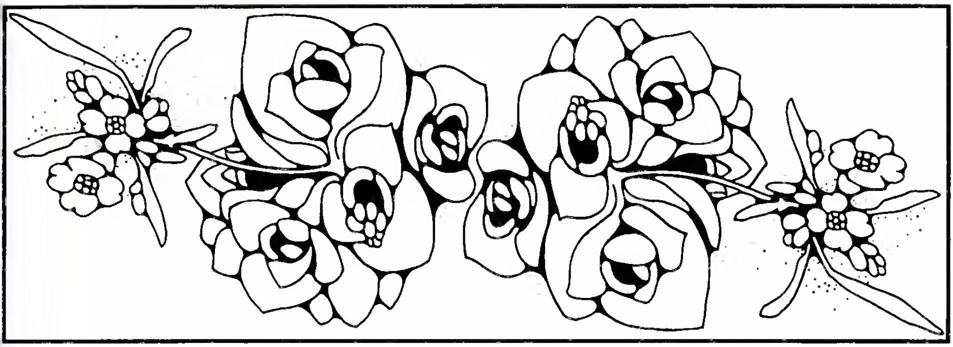

Illustration by Nettie S. Smith

from public lands; this could in part explain the lack of data.) More-over, there is constant change in the practice of wild collection itself, in its environmental context, and in perceptions of its risks.

Not too long ago, digging garden plants from the wild was the usual practice, rarely questioned. A few enthusiasts grew their own, but nurseries and horticulturists for the most part ignored native species. In the eyes of most people, America's vast uncultivated lands and their plants were a limitless resource.

As wild lands have been steadily converted to human use and the shadow of environmental problems has spread, that blithe optimism has waned. In its place is growing appreciation for the value and the vulnerability of the natural world, and mounting opposition to practices that may threaten it. Especially as the surge of interest in native plant gardening has pushed demand for plants to new highs, wild collection for garden use has come under increasing criticism.

To the native flora as a whole, horticultural collection is a far less serious threat than habitat loss or such far-reaching changes as deteriorating air and water quality. It can add to other stresses, however, by reducing the size and genetic variability of local populations, disrupting complex ecological relationships, and physically damaging habitats. For species and plant communities already hard-pressed, continued wild collection has the potential to do significant harm.

The commercial trade in collected plants is estimated to involve hundreds of species sold by a profusion of dealers, from nurseries to hardware stores. Sales of a popular species may well total several hundred thousand plants a year. One Federal investigation, for example, documented a year's shipments of more than 75,000 wild-dug orchids by one dealer alone. To plants collected for sale must be added those dug by individuals for their own use.

What's known about the harm done by wild collection is patchy. Horticultural collection is cited as a major factor in the decline of some species, such as the white fringeless orchid, *Platanthera integrilabia*, listed as endangered in Tennessee, and it has virtually eradicated some readily accessible populations of others. Some species are of concern simply because the demand, and thus the number of plants collected, is so great. Others are considered vulnerable because of intrinsic characteristics such as rarity, slow natural reproduction, limited adaptability, or occurrence in fragile habitats. Most at risk may be species that are both much in demand and inherently vulnerable, such as some alpines and cacti or certain lady's-slippers.

Conservationists generally conclude that the risks of horticultural collection are unacceptable, particularly since any harm that results may be irreparable. Given the extent of commercial collection, it may be tempting to rationalize that the number of wild-dug plants one gardener could possibly use makes little difference. It's never just one gardener, however. The cumulative power of many trowels is considerable, and individual purchases of wild-dug plants add up to the demand that perpetuates wild collection.

At the same time wild collection is falling from favor, nursery-propagated plants are becoming much more widely available. Spurred by the popularity of native species, propagators have made substantial advances in finding ways to handle them, including micro-propagation, and this progress is continuing. New nurseries propagating everything they sell have come into the wildflower trade, and established nurseries are propagating more species as effective methods make propagation more profitable than buying from diggers.

Selective breeding of native species is also adding to the availability of propagated plants. Like such garden staples as bearded iris and hybrid daylilies, the resulting selections and cultivars are available only through propagation. The increase in their number, and the expanding use of American natives in formal as well as naturalistic settings, are together blurring the distinction between traditional gardening and wildflower gardening, not only in styl but in the origin of plants.

The overall effect of these changes is gradual shift away from wild collectio toward propagation of wildflowers an other native species. It is far from com

Propagated plants are generally healthier and better looking with more compact and vigorous root systems than wild-collected ones. Nursery-propagated plants are becoming more readily available plete, however. Long-standing attitudes and practices are slow to change. In addition, growers do not yet know how to propagate some of the most coveted species, and production of others is still too difficult or slow to appear profitable.

During this period of transition, conservation-conscious gardeners need to begin the search for plants with some knowledge about the species that attract them, in particular their propagation and cultivation requirements. Those who choose to buy plants must also look critically at possible sources, recognizing the realities of growing and selling plants as a business.

The simplest strategy is to plan a garden that uses only species that can readily be propagated—not a severe limitation—and to acquire plants either by growing them at home or by buying from nurseries that propagate all their stock. Gardeners able to devote more time and energy to obtaining plants can expand their choices through plant rescues, propagation of more exacting species, and careful checking of other sources.

Given constant change in propagation techniques and nursery practices, any guide to acquiring plants is necessarily general. Up-to-date information is available from a number of publications and organizations (see source lists, p.92); what follows is intended to help put it to work.

A rewarding way to make sure where plants originate is to take charge of the process personally. One time-honored source, a friend's garden, is as appropriate for wildflowers as for other plants. Many species are easy for home gardeners to propagate, including some for which nursery production is not yet feasible. A number of publications give excellent advice on propagation methods, and on obtaining seed, spores or cuttings without reducing the reproductive capacity of wild populations.

Relocating plants that otherwise face certain destruction can provide mature specimens. To improve the chances that rescued or salvaged plants will thrive, minimize the stress of transplanting and give them extra attention.

Plant rescues should have the permission of the landowner, and no plants should be removed from parts of a site that will remain undisturbed. While it's possible for individuals to rescue plants on their own, landowners are more likely to give permission and detailed information to an organized group, such as a garden club or native plant society, especially when a large tract is involved. (For more detailed suggestions on organizing a plant rescue, see Harry R. Phillips, *Growing and Propagating Wild Flowers*, 1985, Chapel Hill: University of North Carolina Press.)

Buying plants is more complicated. Whether plants for sale are nursery propagated or wild collected is sometimes almost impossible to know for certain. The mix of wild-collected and nursery-propagated plants on the market varies widely from one species to another, and few retailers state the origin of the plants they offer. The greater the probable risk of wild collection to the species, the greater the caution that should be exercised in buying plants.

The most straightforward purchases are of plants that for all practical purposes cannot be wild collected—selections and cultivars, as well as at least one species, *Franklinia alatamaha*, that has been extirpated in the wild. Many, such as *Monarda didyma* 'Cambridge Scarlet', are well established in the trade and widely available; those more recently introduced, such as *Kalmia latifolia* 'Olympic Fire', may be harder to find. Some are naturally occurring but uncommon variations, including double forms such as *Sanguinaria canadensis* 'Multiplex' and albinos such as *Lobelia cardinalis* 'Alba'. While an occasional plant could be collected, to dig such forms in quantity would be virtually impossible.

At the other end of the spectrum are species that are virtually always wild collected. Some appeal to too few gardeners to make commercial propagation worthwhile, even though it may not be difficult. More prominent are much-wanted species that so far cannot be propagated or grown on a commercial scale, notably the native orchids, most of which present formidable problems in both propagation and cultivation. Until nursery production of these species becomes feasible, the best choice is to forego buying them; enjoy them in the wild and watch for opportunities to rescue plants.

Between these extremes lies a large and sometimes bewildering group of species that can be and are propagated, but are also collected. Whether one or the other is the more common practice depends on a number of factors, mostly related to the economics of the nursery business. Many are hard for customers to assess.

As a general rule, species that are tricky to propagate or slow to reach marketable size, and thus expensive to produce, are more apt to be wild collected; trilliums, which commonly take five years or more from seed to flower, are one example. Those that are easy to propagate and quick to mature, such as cardinal flower and columbines, are more likely to be nursery propagated. The cost and availability of wild-dug plants must also be considered, however, and many factors besides production cost enter the equation. In any case these are only probabilities, not much help in a particular situation.

Price, by the way, is not a reliable guide. Propagation may be more expensive than wild collection, but expensive plants are not necessarily nursery propagated. Large plants of a slow-growing species, for instance, are generally expensive, and they are very apt to be wild collected.

Some understanding of this background is helpful, but in buying plants of species in this confusing group, a critical look at particular sources is indispensable.

Easiest to start with are those that state explicitly that all the plants they sell are nursery propagated; some add that they do not sell wild-collected plants, and explain why. (What they say isn't necessarily true, of course, it's prudent to test it against what they sell. Would-be deceivers seem more apt just to dodge the issue, though.)

Among this group are some nonprofit organizations committed to native plant conservation. Native plant societies and botanical gardens with a special interest in natives, for example, quite commonly combine public education and fund raising in sales of plants they have propagated.

A small but growing number of commercial nurseries, including many that accept mail orders, also make a point of telling customers that all their wildflowers and native plants are nursery propagated. Although a few are large, general nurseries, most are relatively small. Many of the latter grow all the plants they sell, and their lists often include species that are relatively unfamiliar, or that volume nurseries consider unprofitable to propagate.

The great majority of nurseries, mail-order dealers, and garden centers say nothing about how they acquire plants. No particular meaning should be read into their silence; it's customary for those who sell plants to focus on descriptions and cultural requirements. Don't be misled, however, by phrases that convey no information about the *origin* of the plants, such as "nursery grown" or "field grown, "specially selected" or "bred for garden success." Note other characteristics as well; a feverish sales pitch, careless nomenclature, sketchy cultural information may suggest more serious interest in profits than in plants.

The words to look for are *nursery propagated.* In the absence of that phrase or an unambiguous equivalent, ask about the origin of the plants. Those who know their plants are nursery propagated will say so without hesitation. Nonanswers or evasions however graceful, should at least trigge further questions, and in some instances send you to another source.

One frequent reply is that plants come from wholesalers. Most local garden centers and probably a majority of mail-order retailers do buy from other nurseries, but they should know or be able to find out how their suppliers obtain plants.

Two common replies may leave unanswerable questions. One is that the plants have been rescued. Some people familiar with the trade maintain that most wild collection is from sites where destruction is imminent, but they also acknowledge that some plants labeled "rescued" have been dug from sites where there is no prospect of disturbance. When the claim of rescue is valid, it does answer objections to wild collection on conservation grounds. Without personal knowledge of the seller and the rescue site, however, its legitimacy is almost impossible to determine.

The second is that plants have been harvested from wild populations on a sustained-yield basis. That is theoretically possible, at least for common, abundant species, although lack of information about population dynamics in a changing environment may make it difficult to determine what yield is sustainable. Like the claim of rescue, however, the claim of carefully gauged harvest is extremely hard to verify. The likelihood that rescued or harvested plants will succeed in the garden is the same as for any wild-collected plants.

As a cross check on the answers a source has given, or when those answers are ambiguous, examination of the plants themselves may give clues to their history. If possible, look at several plants of a species, not just one. Does it seem more likely that they were dug from their wild habitat, or reared from the beginning under nursery conditions? This approach is useful in a local garden center, where it may be difficult to get questions answered, but it can also be instructive as an after-the-fact assessment of plants bought by mail.

Look at the plants' general health. Poor color, sparse foliage, weak stems, legginess, old wounds, all suggest wild collection, not to mention what they say about quality.

Check the size or apparent age, keeping in mind the investment a nursery must make to produce a large plant. Especially in species that grow slowly, large, or obviously older plants, are more likely to be wild collected—for example, ferns with rootstocks carrying the remains of many fronds. On shrubs such as mountain laurel, watch for good-sized stumps near ground level, typical of a wild-dug shrub that has been cut back to stimulate new growth.

Look at the way the plant is potted. Nursery-propagated plants are usually more or less centered in the pot, and their foliage falls naturally.

Are other plants sharing the pot or the root ball? Fast-growing extras may crop up in the tidiest nurseries, but few intentionally propagate mixed clumps. Bonus plants that are also salable—a garland of ferns at the base of a rhododendron, for example, or a Jack-in-the-pulpit in a clump of foamflower—suggest wild collection.

Turn the plant out of its container if possible. Nursery-propagated plants are usually grown in a light, uniform mix, often containing shredded bark or obviously artificial materials such as perlite. Compacted clay, large stones, or different soils in one pot are more likely with wild-collected plants. Allowing for the habits of different species, the root system of a nursery-propagated plant will be relatively compact; it is unlikely to be lopsided, thin and straggly, or patently crammed into the container.

It seems likely that wild collection will eventually be replaced by propagation, but "eventually" may be some time in coming. In the meantime, through care in acquiring plants, gardeners can both add to their own pleasure and take their stand with all who are working to ensure that wildflowers and native plants remain part of a treasured living heritage. ❦

A clump of pearly everlasting, *Anaphalis margaritacea*, thrives near the tree line at Mount Hood in Oregon.

CREATING A NATURALISTIC GARDEN

DARREL G. MORRISON

You don't create a natural-looking garden by simply "letting things go." As appealing as that concept might be from the standpoint of ime and energy, there have been too many environmental changes on most residential sites to make that a realistic option. For example, much of the native vegetation has been removed and replaced with imported plants. Hence, a *laissez-faire* approach under such conditions is likely to produce a chaotic mix of native and exotic plants. The process of recreating a natural landscape, or even a natural looking garden requires conscious manipulation and "design."

How do you go about designing "naturalistic" gardens? As a landscape architect convinced of the value of natural appearing landscapes, and as a teacher, I would ike to share observations that I have made during the past couple of decades of working with both natural and designed andscapes.

First of all, we can't design gardens that will equal the order, complexity, integrity and beauty of the typical undisturbed natural landscape. But we can learn about design from the processes and forms that occur in such natural landscapes.

Sadly, there are few examples of minimally disturbed natural landscapes remaining. However, due to the efforts of some far-seeing individuals and organizations such as The Nature Conservancy, there are still, in many regions of the country, representative examples of naturally evolved landscapes which can provide both information and inspiration.

During the past 15 years I have taught field courses that deal with the composition, structure and aesthetic characters of native plant communities. These experiences have convinced me of two things: (1) there is great value in studying natural landscapes and native plants in the field, where one can hear, see, smell, touch and even taste them; and (2) the natural landscapes for study and enjoyment are more critical than ever as more and more of our land is "developed."

Lessons from Nature

An important concept is the presence of *plant communities* or *associations* of plants that frequently occur together under specific environmental conditions within a particular region. When these associations have not been greatly disrupted by human activity, there is an order and a visual harmony present, resulting from the fitness of the plants to that environment.

A plant community may be defined as "a group of plants living at a particular place at a particular time." Plant communities

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may be identified by some of the key species in them (e.g., the oak-hickory forest, the beech-maple forest), or by their environmental characteristics (e.g., the floodplain forest, the sandy ridge forest). Rarely is a plant community a sharply defined entity. Instead, one community may grade almost imperceptibly into another. Nevertheless, the plant community provides a framework within which we can approach the design of natural appearing gardens. Several characteristics of naturally evolved plant communities are useful as a basis for designing naturalistic gardens:

1. Species composition. A good starting point is to determine the key species that occur together in a specific environment; for example, on a dry, south-facing slope with rocky soil or on a moist, north-facing slope with deep, rich soil. Learn what the *dominant* species are; that is the major plants that have the greatest influence on the community. In a forest, the dominant species are typically the canopy or overstory trees. In a prairie, they are the grasses.

Next, learn which species are most *abundant* or *prevalent*; that is the ones that occur in greatest numbers, whether they are the canopy trees, the middle-story trees and shrubs, or the ground-layer vegetation. Then, learn additional species which are critical to the visual character of the community. They may be species with distinctive branching, flowering or outstanding fall color that makes them important visually in the natural model *and* hence, in designed landscapes based on that community. I refer to these as the "visual essence" species.

2. Plant distribution patterns. With an understanding of the most important species in a plant community, the next step is to observe the distribution of each species. There are two different aspects to plant distribution within a community: (a) the species' distribution relative to microclimates (Does a plant grow only at the edge of the woods, does it grow only on the interior, or both? Does a plant grow only on the upper, drier slopes, or on the lower, moister slopes, or both?); and (b) the species' characteristic degree of aggregation or "clumping" (Does the species usually grow as an individual, or in loose colonies, or dense clumps?). Knowledge of the distribution of a species in a plant community has obvious implications for planting that species in a designed setting.

Some of the above information can be obtained from books or other publications. Or it may sometimes be obtained from local botanists, but the best way to learn it is through first-hand observation, preferably with someone who is familiar with the regional vegetation.

3. Natural order. In undisturbed natural landscapes, we often sense an order or unity that is missing from the human-dominated environment. Natural order is not a simplistic, orchardlike order. Instead, it is a subtle order that results from the repetition of lines, forms, colors and textures within a particular plant community. For example, in a temperate North American forest, limited numbers of tree species will dominate the canopy level. In the Midwestern prairies, 90% of the vegetation is comprised of five or six grasses with their fine textures unifying the landscape.

4. Variety and diversity. While there is visual harmony or unity resulting from the limited array of species within a specific environment, there is also visual variety and diversity. For example, while the tree canopy may be made up of a half-dozen species in a woodland, the ground layer beneath may typically include nine to twelve species per square meter. And while the prairie is mainly composed of fewer than 10 species, there may well be an additional 50 or 60 species-per-acre occurring in small numbers. Additionally, visual diversity results from varied spacing and different ages and sizes of plants within an rea. Ephemeral qualities, such as changng flower and foliage displays, also ontribute seasonal diversity.

5. Spaces and edges. The shape of natual open spaces provides useful guidance or designing spaces. In nature, the river rovides one of the most useful analogies or garden designers. A river winds through landscape, widening at turns or bends, nd disappearing behind "peninsulas" of egetation. This provides an element of nystery, encouraging the observer to want o see what's beyond the next bend.

Enclosing vegetation usually has ounger, shorter shrubs at the front edge. lso, rather than a continuous, consistent all of enclosing vegetation, there are indiiduals or clumps of plants advancing into he open space, and points where the space enetrates into the enclosing vegetation. he result is a softness to the edges in ature, unlike the hard edges we see in rban settings.

Designing the Garden Using Natural Principles

The naturalistic gardens we design are implifications and stylizations of the natual landscapes they emulate. Yet they can ave the "essence" of nature about them, articularly over time.

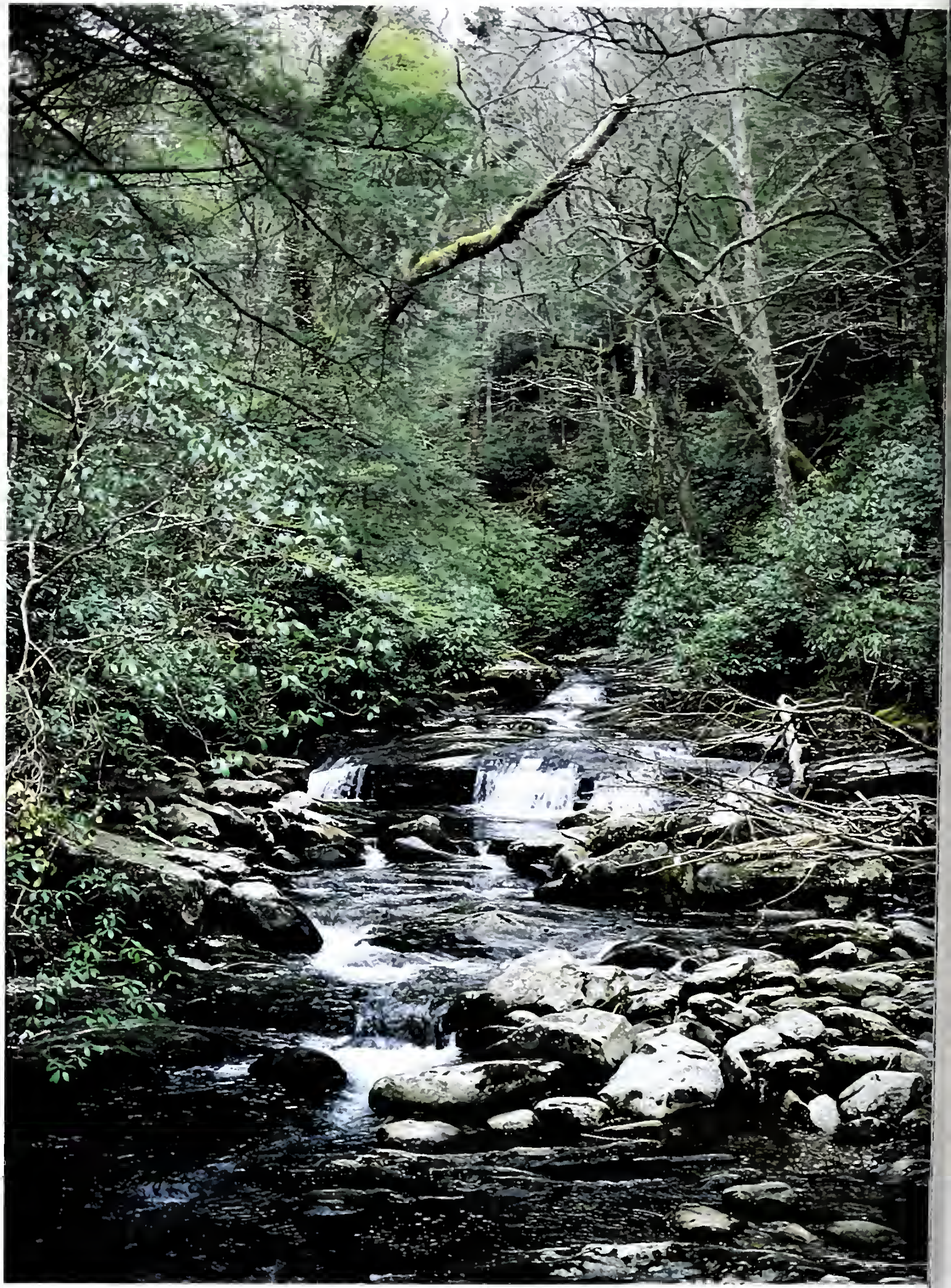
Here are some steps in the design of a aturalistic garden, and some suggestions f ways the lessons we've learned from ature can be applied:

Site analysis. An important first step is o gain an understanding of the environnental characteristics of the proposed arden site. For example, determine the oil type(s), sun/shade distribution, relaive moisture and existing vegetation. In egard to existing vegetation, we need to now both the plants that are undesirable nd therefore may need to be suppressed r removed, and the desirable plants that ill contribute to a natural appearing landcape. A "purist" philosophy suggests emoval of any exotic species; in reality, compromises may need to be made.

Mass-space plan. The next step is to develop the spatial form of the garden. There will almost certainly be a pathway or system of open spaces in a garden. The form of these might well emulate the river with its gentle to sweeping curves, and its partially concealed spaces. The "river of space" may be translated into a pathway surface, or a mulched area or lawn (acknowledging that the garden is a stylized form of nature). Next, lay out zones of vegetation within different height ranges; for example, ground-layer plants below three feet in height; middle-story shrubs and small trees in the three to fifteen feet height range; and taller, canopy trees. Laying out these zones—on paper and/or on the ground—will be very helpful to provide the "structure" of the garden.

Plant selection. The next step in the design is to select the plant species for the different height zones of the plan. With an understanding of environmental conditions on the site and of the needs of the native plant communities in a region, you can simply select species from the appropriate community(ies) for the native garden. In general, the closer you adhere to this principle, the more likely you will be to have a unified, harmonious garden. But there may be situations in which exotic species are selected; for example, to expand the blooming period. Some precautions to doing that: (1) avoid introducing species whose flowers will overpower the native species; and (2) always avoid plants that have been known to get out of hand and invade surrounding natural areas. Purple loosestrife (*Lythrum salicaria*) is a prime example of such an aggressive species.

Plant placement. Having selected a palette of plants for a naturalistic garden, arranging those plants within their respective zones is the next step. A simple but effective approach is to delineate the different vegetation zones, and then use



Along the East Coast the major plant communities are forests, such as the evergreen Spruce-Fir Community of high altitudes and latitudes and Pine-Oak-Hickory Communities at lower altitudes and latitudes.

The golden leaves of birch dominate this autumn scene in New York State.

color-coded stakes to locate individual plants within each zone. While it is unlikely that you can initially plant at the same density as nature does, the same principles of distribution can be followed; for example, "drifts" of some species may flow through the zone; other species that occur as individuals in nature may be distributed similarly in the garden. There may well be spaces between plants or drifts of plants which are mulched, providing an environment for the natural spread of the initially planted vegetation.

In the case of meadow-or prairie-like plantings, zones may be identified for different seed mixes, rather than for the placement of individual plants.

At edges, where plants meet the pathway or open spaces, the slightly undulating, irregular edges of nature may be emulated through the plants' placement.

Change over time. Just as a natural landscape is ever-changing, so is a naturalistic garden. In fact, one of the great rewards of naturally based design is that it will change as plants increase and "migrate" into hospitable niches. In the early years of a naturalistic garden's evolution, it is particularly important to watch for intrusions or reappearances of aggressive exotic species that may take over. Also, as conditions change; for example, as more shade develops, additional plants or seeds may be introduced, and others will be shaded out. Finally, in order to perpetuate the composition, selective removal or pruning may be necessary.

Summary

Natural appearing landscapes do not "just happen" in our previously disturbed environment. But they can be designed, planted and managed so that they resemble the natural landscapes which inspired them. Studies of relatively undisturbed natural landscape provide one of the best ways to learn principles of design that can be incorporated into the gardens. ♥

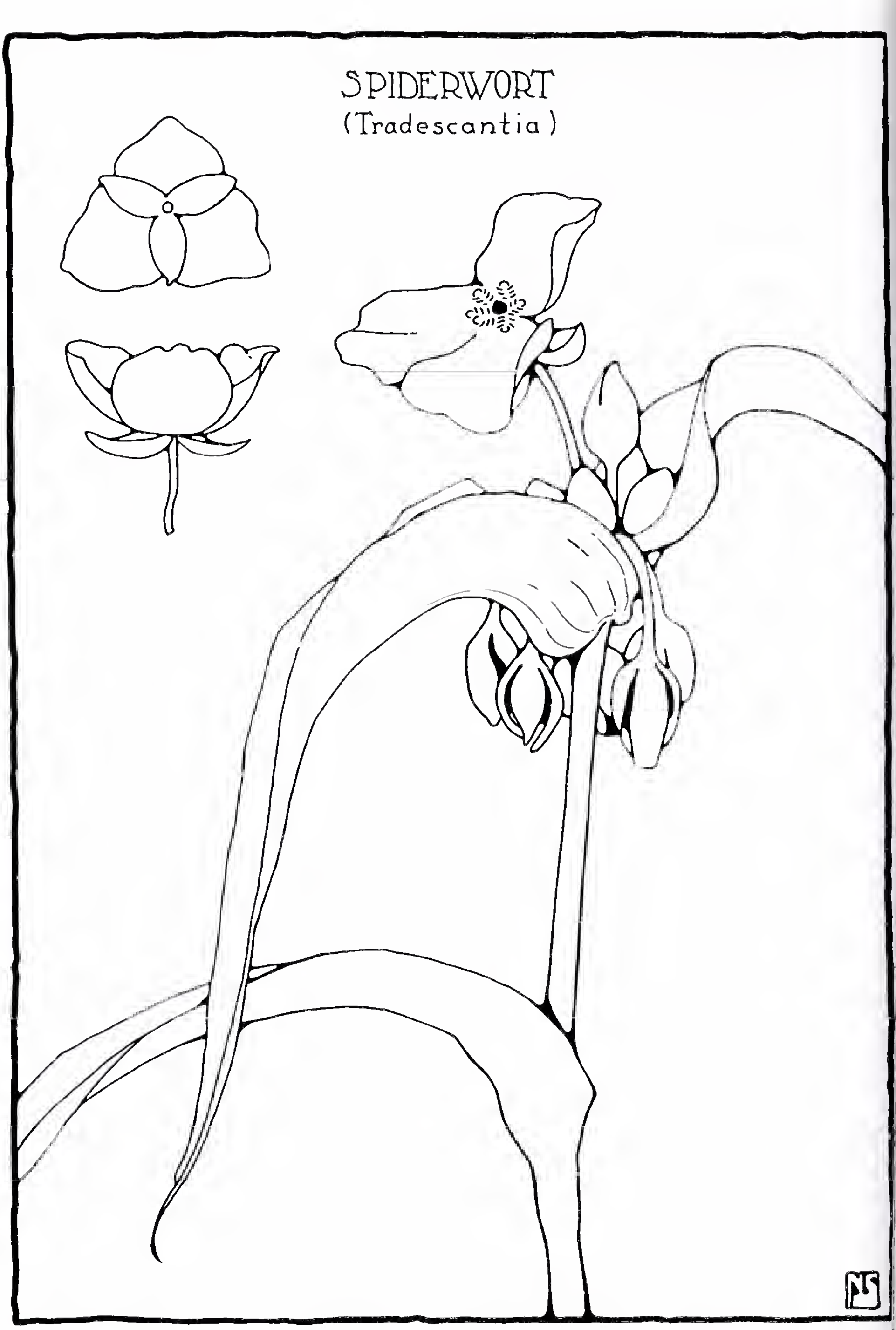


ILLUSTRATION BY NETTIE S. SMITH

MAINTAINING THE NATURALISTIC GARDEN

RICHARD W. LIGHTY

The maintenance of gardens is often held to be a tedious and mindless job. It is regarded as something apart from the making of gardens, and this may be true for some public or ommercial landscapes; but fine gardening demands continuing personal involvement of the garden maker, not only in planting and renewal, but in the routine care. Gardening is a dynamic art; the product of natural growth and the gardener's wishes, and maintenance is the choreography of nevitable change, daily, seasonally and hrough the years. Seen in this light, garden maintenance is a creative and enjoyable process which fine tunes the garden to the taste of the gardener.

The tasks involved in garden maintenance are the same for all types of gardens, but the particular approach to accomplishng the task depends on the style of the garden and the preferences of the gardener. Gardens, even naturalistic ones, differ from nature in two important ways: they require a higher level of interest through the seasons and they require that plants grow in sites we, not they, have chosen. These are also the major reasons maintenance is required. I can't resist adding that this effort is considered a pleasant pastime by a large portion of our population.

The basic tasks of garden maintenance are: the control of undesirable and desirable vegetation; the removal of dead or dying plant parts; and provision for the plants' needs for water or nutrients.

Weeding — The Control of Unwanted Vegetation

There is a variety of approaches to this oldest of tasks and thoughtful gardeners will consider which is most appropriate in each situation. Hand-pulling of weeds, roots and shoots is the most certain and precise. Its disadvantages are in the time it takes and the necessity of stooping or kneeling. It also disturbs the soil which brings new weed seeds to the surface where they quickly germinate. Despite this, it is often the quickest method of eliminating non-rhizomatous weeds from tight ornamental plantings, but it will never eradicate established weeds with extensive rhizomes or sprouting root systems.

Tools and machines such as hoes, cultivators and hand weeders need more room in which to operate than do fingers, but

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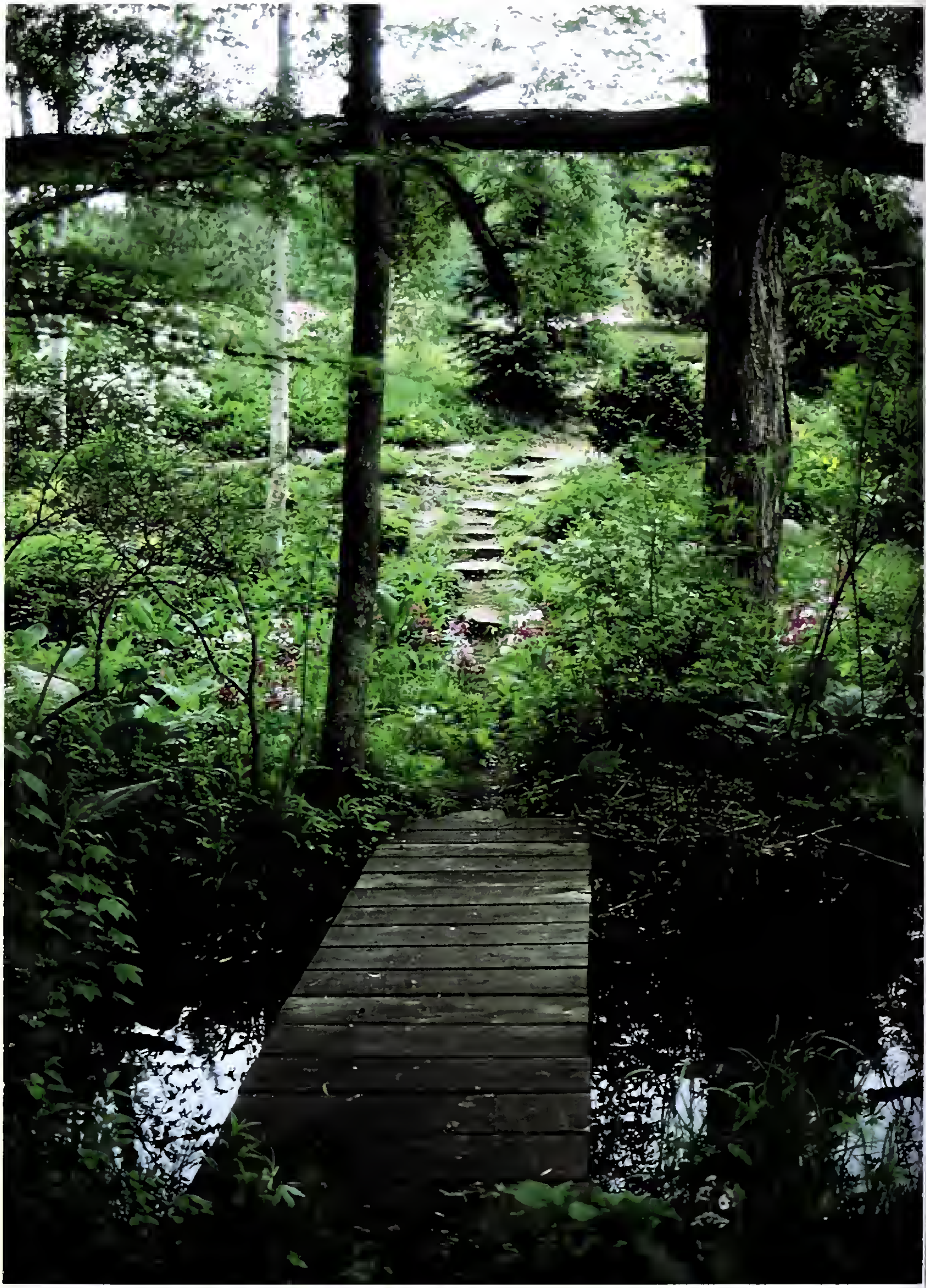


Candelabra primroses, although not native, make a pretty scene in a naturalistic garden along a Connecticut streambank.

they cover the ground more quickly. They also disturb the soil, bringing a new crop of seeds to the surface and they destroy fine feeder roots of desirable plants. Power cultivators have limited use in established naturalistic gardens, but there are places where hoes and hand weeders can hasten the task without creating a problem. Where plants like trilliums or Christmas fern have a wide "overhang" to shade the soil, hand tools can be used to scratch the surface without increasing the weed problem.

The final method of controlling established weeds is with herbicides. The term encompasses a variety of chemicals that can be dangerous to humans and other organisms that share our environment. Care should be taken to use the least hazardous ones in the safest possible way. Always follow the label directions. Herbicides should be used only when they represent the sole practical means of control. In general, I do not advocate the use of persistent, soil-actng herbicides such as the pre-emergence ypes in common use on some nurseries and farms. All herbicides must be carefully applied at the correct rate. The types I recommend are those absorbed by the green issues, such as leaves, and subsequently ranslocated throughout the plant, killing it slowly and surely. Somewhat less useful are hose that kill only the green parts touched by the spray. In the first group we have ypes which are *selective* and can be sprayed on all vegetation but kill only certain types. The most common of these are 2,4-D and elated compounds which kill broad-leaved plants without injuring most grasses. For he naturalistic gardener these can be helpul in keeping meadows weed-free by pot-spraying only the areas of infestation. hey will, however, injure or kill broad-eaved ornamentals in the same area if they drift or volatilize excessively. There are sevral recent additions to the arsenal of herbicides which kill grasses but do not njure most broad-leaved plants (e.g. oast™, Fusilade™. These, when labeled for use with ornamentals, will be useful where rhizomatous grasses are a problem.

Non-selective, translocated herbicides must be sprayed only on the target weed. Glyphosate (e.g. Roundup™, Kleenup™, Rodeo™) is the most common of these and can be very effective when "dribbled" at low pressure from a sprayer or applied by moist sponge. These methods, if carefully used, will avoid any splash or accidental application to desirable plants. For concentrations and restrictions, always consult the label.

The single most important purpose of any weed control measure is to kill weeds before they go to seed (in the case of annuals or biennials) or before their rhizomes or root systems spread throughout the planting (in the case of perennials). By eliminating them when they are small you have the additional advantage of less soil disturbance.

Much effort can be avoided by having all soil covered with either vegetation or leaflitter so that small weed seedlings can't get started. Gardeners in public gardens with naturalistic plantings have for years used shredded oak leaves as a mulch applied in early winter. If the leaves are chopped to a size of about one and one-half inch, they will settle in to provide a loose blanket, reducing frost heaving of shallow-rooted plants and preventing the germination of weed seeds. The size and looseness allows established plants to come through without problems. Leaf chopping can be done at the time of leaf removal in the fall. Some vacuums (e.g. Roof™) chop and bag as they remove, but hand-raked leaves may be chopped by repeatedly running over the pile with a lawn mower set as high as possible. Oak leaves are the best, but others may be used as long as care is taken to keep the soil pH suitable to the plants being grown. Heavy, leathery leaves should be avoided as mulch.

While its use is restricted by social and safety considerations, the periodic use of fire can help in the maintenance of meadows and certain very specific woodland gardens. Those who feel it might be appropriate should check with their local authorities and with experts in nearby public gardens regarding legal limitations and horticultural advisability. Mowing or use of a string trimmer is an alternative to burning but does not kill weed seeds and seedlings as fire can.

The Control of Beneficial Vegetation

Once the garden has developed as planned, the gardener will be in the enviable position of spending more time controlling the desirable plants than fending off invaders. But it still takes time, and the following approaches will ease the task.

Select your herbaceous plants carefully, not only for aesthetic attributes, but to avoid excessively invasive plants. In general, gardeners who let bishop's goutweed (*Aegopodium podagraria*)*, yellow archangel (*Lamiastrum galeobdolon*)*, gooseneck loosestrife (*Lysimachia clethroides*)* or their like into the naturalistic garden, will live to regret it. Also know what you are doing when you plant garden phlox (*Phlox paniculata*), foxglove (*Digitalis purpurea*)*, fountain grass (*Pennisetum alopecuroides*)* or others that seed themselves profusely. While the methods outlined for weed control apply generally to the control of ornamentals, translocated herbicides should not be used on the latter unless you wish to eliminate the plant entirely.

Even those plants that are clump formers may spread fast enough to become a threat and all will ultimately need division and resetting if they are well cared for. Plants should be carefully selected and spaced so that the ground is covered in a year or two and still permit the plant to grow for five to ten years before needing division. Since rate of growth is affected by many factors, each gardener must experiment to arrive at the best approach for a particular site. The usual mistake is to plant too closely so as to produce a quick effect, and this necessitates frequent division. Gardeners should carry pruning shears and constantly trim back the edges of vigorous plantings to keep them from overgrowing less hearty neighbors.

The control of desirable woody plant growth is more straightforward. The most important requirement is for gardeners to understand the growth habits of their plants; where long growth occurs, where buds which give rise to new shoots are found, what the effect will be of removing a particular shoot, and what the ultimate size and character of the plant will naturally be. One is then equipped to direct growth in ways that allow all the plants to fit harmoniously into the garden. In general, prune small amounts, do it frequently and begin early in the plant's life. Prune throughout the year, being careful not to remove large portions of the plant in late summer when the resultant new growth will be less winter hardy. Large-scale pruning should be done in mid-winter. When tampering with the canopy, the upper layers of branches in a woodland, gardeners should not be tempted to let too much light in too quickly. This will increase all growth and bloom in the under-stories, including that of weedy species. After all, naturalistic gardens need not strive for the bloom of a formal bed of annuals. When thinning the canopy, remove branches throughout the crown of the trees, not just at the bottom (limbing up) or storm breakage and blowdowns will result. Another rule: Never alter the natural form of the tree or shrub drastically. The eye will read this as artificial.

The Removal of Dead or Dying Litter

Leaf removal is as essential in a woodland garden with an herbaceous layer as mowing is in a meadow. Without it plants are smothered and reduced in size and diversity. Raking is the simplest, most careul way of removing fallen leaves, but it also s the most time consuming. If you have an rea of any size, consider a large-wheeled eaf vacuum which chops and bags the eaves as it removes them. As mentioned efore, the leaves can then be compactly iled nearby for return to the same area as nulch in early winter. A pitchfork is ideal or putting on a light and airy cover. Try to vait until rodents have found homes elsevhere before putting the leaves back, lthough chopped leaves make less desirble cover for these furry foes than do vhole leaves. Other, more expensive nulches can be used, but none have the atural look of leaf litter. Bed cleanup can e done as the leaves are removed, but nany gardeners enjoy the brown seedheads s an important part of the winter garden. ecause of the complexity of a naturalistic arden, bed cleanup requires close attenion and hand work, although a skillfully sed weed whip can make tasks such as the emoval of old flowering stems easier.

Provision for Basic Needs

Again, because any garden is unnatural the extent that it is a garden, input is onstantly required to keep the site as esired. By putting more plants of more rts in an area than would be found there aturally, we come up against the problem f limiting factors. Whereas in a natural rest, many herbaceous plants go dormant t the onset of mid-summer drought, the ardener strives to maintain contrived ffects of texture, form and green throughut the season. Since there are more plants a given area than nature usually supports nd, since aesthetics-conscious gardeners se moisture-requiring plants in unnatully dry sites, water becomes limited and ust be supplied from sources other than infall. While overhead sprinklers have traitionally been used because of their exibility, they are wasteful of water and n abet the spread of foliage diseases and ts. A new generation of trickle irrigation devices and soaker hoses promises less waste, but these, if installed for a season, have problems of unsightliness in a naturalistic garden and lack flexibility as the garden grows and changes. A general rule for watering, if you must, is to do it as soon as the need becomes evident (not critical), and do it in the very early morning. In normal years watering should not be a major time-consuming task if your garden is planned properly. Burying seasonal water lines before you plant the garden will decrease the need to carefully thread hoses through prized plantings.

Nitrogen becomes a limiting factor in somewhat the same way. Most of us can easily see when a plant is thriving, and we know that "fertilizer" makes this happen. Indeed, we tend to supply too much nitrogen and this has a number of troublesome consequences. It may delay or reduce flowering make the plant more disease and drought susceptible and by increasing soft vegetative growth, can shorten the life of perennial plants or at least the length of time before they need division. Moderation in the application of all fertilizers should be the rule. I do not fertilize any plantings unless they show signs of deficiency for some element. Usually this is nitrogen, and I correct it with a half-cup of 5-10-10 per square yard. Light fertilization and watering will also help many of the spring ephemerals, such as bleeding heart (*Dicentra eximia*), corydalis (*Corydalis lutea*) and bloodroot (*Sanguinaria canadensis*), remain green later into the summer.

Several things the gardener can do at the beginning will have a salutary effect on garden maintenance. Burying water and electric lines in convenient spots throughout the garden is one of those. Electrical tools are often lighter, usually less expensive and have fewer moving parts and a lower repair frequency than their gasoline counterparts. For the home gardener they make sense. Design of the garden for maximum path frontage (consistent with the overall aesthetic design) will allow the gardener to plant for higher interest while maintaining less total area. It is the intimate and varied combinations near the path that add delight to the garden. An overall plan at the start will enable the gardener not only to bury utilities and lay out paths, but to phase garden development so that only as much area as can be cared for will be in a disturbed state at any time. As each area matures, the gardener can advance into another. This slow development also allows the gardener to accomplish disruptive tasks like thinning trees, removing shrubs and placing stones before planting, and to gain experience in maintenance and correct early mistakes before embarking into a new area. Unimproved areas can be left as nature leaves them or mowed and kept weed free until you are ready to plant. The alternative is to be endlessly engulfed in tall weeds that must be hand pulled.

Finally, it is hoped that this brief treatment of the most time-consuming (and the least considered) aspect of gardening will inspire gardeners to look at the vexing problems of maintenance with the confidence that by analyzing their particular situation and applying appropriate technology to the basic tasks involved, the care of their garden will become as pleasant as its making.

*Editor's note: These plants are not U.S. natives.

Some Rules of Thumb

1. Don't change conditions in ways that increase maintenance unless the trade-off is worth it.

Examples: Clearing out brush or opening the canopy increases bloom and the variety of plants you can grow, but it also increases weeds and weed growth. Shade gardens are peaceful in more ways than one.

Aquilegia canadensis pokes through a picturesque bench at the Mt. Cuba Center in Delaware.

Tilling the earth for planting also provides a fertile field for weeds and brings weed seeds to the surface. Limit the amount of disturbed and bare ground by the energy you have to care for it. In a naturalistic garden, living plants and dead litter are the desirable surface covers.

2. Plant for permanence - a function of the plant's persistence within the bounds you have assigned it. An ideal planting will neither overgrow its neighbors nor decline noticeably in vigor over five to ten years so that it needs restoration. Your own experience is the best guide.

Examples: Use slow-growing, long-lived, clumping plants in combination with lower, shade-tolerating ground covers to control weeds. For example, trilliums or merrybells (*Uvularia grandiflora*) planted with *Phlox stolonifera.*

Use slow-growing shrubs and trees. They take longer to achieve their effect, but require less control over their long life. A silver maple will provide shade in five years but will threaten the house in another ten, while a white oak will take ten years to give much shade, but will be a solid and well-behaved specimen for several hundred years.

3. Combine tasks to avoid handling materials or reworking unnecessarily.

Examples: Fall leaf removal can be combined with mulching if a leaf vacuum/chopper is used.

Weeding, dead-heading and summer pruning can all be done simultaneously. Make several "sweeps" through the garden each summer and carry with you the tools to do all routine tasks.

4. Look hardest at those tasks demanding most time or effort. A small savings here means much more than a large savings in a trivial task.

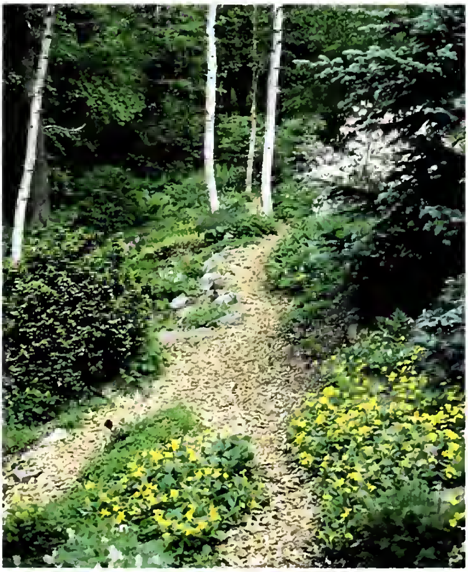
Examples: A technique which reduces weeding time in a newly-planted ground cover is more worthwhile than completely solving the small weed problem existing after it is established.

Contouring the lawn edges to fit the radius-of-turn of your mower will save a large amount of time spent in hand trimming. It will probably save more than that gained by using string-trimmers or trim mowers in the same area.

5. Try to eliminate tasks that consume even small amounts of time each week or each year, if that task must be repeated endlessly.

Examples: Careful, slow application of a foliar-applied, translocatable herbicide, to Canada thistle growing in a ground cover will put an end to pulling it or digging it several times a summer, year after year.

Removal of all broadleaved weeds in the lawn adjacent to beds at the same time these weeds are removed from the beds will prevent the back and forth seeding from one area to the other. In a few years you will notice fewer weeds in both areas. ❦



A Connecticut woodland walk in spring with foamflower and *Chrysogonum virginianum* in full bloom.

DESIGNING WITH NATIVE PLANTS

Darrel G. Morrison

The new, or newly revived, interest in designing with native plants—trees, shrubs, vines, wildflowers, ferns and grasses—presents a whole new series of challenges to the landscape architect. The purposes of this article are: to identify some of the differences between traditional landscape design as it is currently being practiced and new forms of design that rely more heavily on the use of native vegetation and natural processes; and to suggest ways in which naturally evolving landscapes may serve as models for designing landscapes that are both ecologically sound and aesthetically satisfying.

Current Practices

Before discussing the range of potential approaches and techniques for designing with native vegetation in ways that depart to some degree from current landscape design practice, it is appropriate to review those practices as seen in present-day planting design. This discussion is a generalized view and does not take into consideration many individual variations, but it does provide a basis for comparison.

Designing with plants—whether in a traditional mode or in the alternative native landscape approaches—involves two major components: selection of plants and placement of them in the landscape.

Plant selection. In typical contemporary landscape design, plant selection is primarily influenced by:

1. Aesthetic characteristics such as the forms, texture and seasonal color characteristics of plants.

2. Functional capabilities such as the capacity of plants to provide shade, windbreaks, enclosure, visual screens and erosion control.

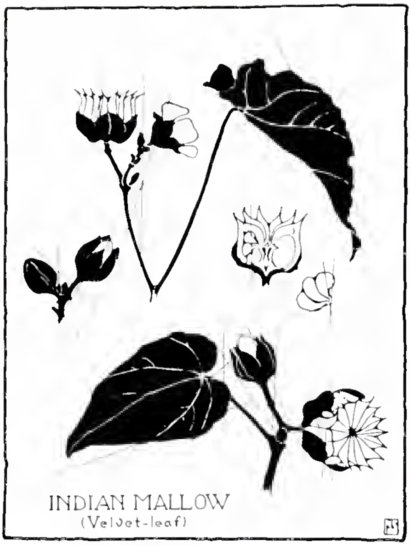
3. Environmental tolerances such as cold hardiness; drainage requirements; sun, shade and wind tolerance; and, in some urban areas, the ability to survive the effects of pollutants in the soil and atmosphere. The moisture requirements of plants are characteristically given only secondary consideration, because of the relative ease, up to now, of providing regular or periodic supplemental water to plants that require more water than precipitation provides.

4. Commercial availability. A very real consideration in plant selection is the availability or non-availability of a plant species. Plant producers, especially the large nurseries, tend to mass-produce large quantities of a relatively small number of species that are well known and reliable. They typically include both native and exotic species, as well as hybrids and cultivars; and for the most part, the plants' origins are not clearly differentiated.

Similarly, there is in typical landscape design today little attempt to select a native over a non-native species, if both have similar aesthetic attributes or functional capabilities. For example if designers were looking for a canopy tree with showy yellow fall foliage color for a site in hardiness Zone 4, they are probably as likely to select a *Ginkgo biloba* (ginkgo) from eastern China as a *Fraxinus pennsylvanica* (green ash), whose natural range is central and eastern North America (Wyman, 1951).

Generally, in selecting mid-story trees and shrubs, there is a tendency to select plant species with at least one outstanding aesthetic attribute, such as showy flowers, brilliant fall color or conspicuous fruit. Evergreen shrubs are particularly valued. This is evidenced by the number of conifers such as *Juniperus chinensis pfitzeriana* (Pfitzer juniper); *Taxus cuspidata* (Japanese yew); broad-leaved evergreens such as *Ilex* (holly); and *Photinia serrulata* (red-tipped photinia) in the designed landscapes of different parts of the country.

Similarly, in the selection of ground covers, there is a strong tendency to choose repeatedly a few species that are green all year round. One of the most widespread ground covers in designed landscapes is *Hedera helix* (English ivy). Other frequently selected ground covers include *Vinca minor* (periwinkle or myrtle) and *Pachysandra terminalis* (Japanese spurge). All of these were introduced from Europe or Asia more than a century ago (Wyman, 1949).



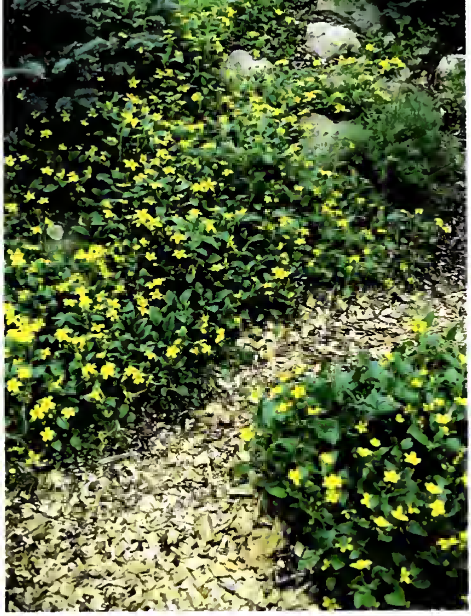
Of course the most widely used ground-cover plants in contemporary-designed landscapes are the sod-forming lawn grasses, which are almost without exception exotic species and are typically maintained with substantial inputs of fertilizers, herbicides, water and energy (Diekelmann and Schuster, 1982).

Since neither the lawn grasses nor the other ground covers display conspicuous flowers, color at the ground-layer level is typically provided by seasonal displays of bulbs and annuals.

Plant placement. Just as plant selection tends toward simplicity and order, so do the current practices of plant distribution or placement in the designed landscapes.

Trees are often planted as individual specimens in lawns, or in rows that reflect the geometry of surrounding buildings and streets in urban areas. In larger parks and on institutional grounds, they may be grouped in borders and islands, often spaced 25 to 30 feet apart, with all trees in a group of a single species and size.

Shrubs may be used singly as accents. More frequently, they are grouped with other members of the same species, equally spaced in rows or mulched beds. Either in a conscious effort to give shrubs an architectonic form or to keep them from outgrowing their situation, they are clipped, creating either square or rounding



Chrysogonum virginianum is a good choice for light shade.

forms that are dense and compact.

Ground-covering plants are generally spaced closely, at six to twelve inches apart, for a quick, uniform cover. Again, one species is typically used within a specific area in such plantings. Beds of ground-cover plants are usually clearly differentiated from lawn areas and other ground-cover beds, delineated by sunken steel edging or other materials that lead to distinct edges.

Bulbs and annuals, when used, are characteristcally planted as solid masses for maximum color effect, although bulbs such as *Narcissus* species may be naturalized in areas covered with a mulch or planted with other ground covers.

Contemporary traditional landscape management is geared to leaving both the species composition and distribution patterns of plants unchanged. Invading plants are removed, and reproduction of the initially planted individuals is inhibited.

Where feasible, existing trees are often preserved and incorporated into designed landscapes, sometimes at great expenditures of effort and money. Such trees, individually or in groups, tend to provide a link with the region's natural environment. Interestingly, though, where groups of trees are preserved, there is a strong tendency to clear out middle-story and ground-layer species, replacing them with the "cleaner" look of lawns, mulch beds, or monotypic blankets of ground cover such as English ivy.

Differences in cold and heat tolerance lead to some variations in the palette of plants used in different regions. Differing moisture requirements, on the other hand, are often accommodated through irrigation, making it possible to grow plants from a moderate to high rainfall region in an arid or semi-arid environment, or to grow plant species from natural lowland habitats in upland situations.

In summary, one of the effects of much of the current practice in planting design is to produce landscapes that have less and less resemblance to the natural landscape of the region in which they occur. At the same time, the designed landscape of one region tends to resemble more and more the designed landscapes of other regions.

Aesthetically, the prevailing contemporary-designed landscape tends to be ordered, with smooth green lawns interspersed by predominantly dense and dark green shrubs planted as hedges or in masses and symmetrically shaped trees planted either as individual specimens or in rows or groups composed of individuals of the same size and species. The only visible changes that are noticeable in this landscape are changing foliage colors of some of the trees and the changing displays of bulbs and annuals.

Natural Alternatives

In contrast to the relatively predictable, orderly and static landscapes that are products of typical planting design, there is a wide range of landscape possibilities that incorporate plant species native to the

Fothergilla major puts on a dramatic fall display.

region and the microhabitat type in which they are planted. We might portray these potential approaches on a continuum that increasingly departs from standard landscape design practices and progressively incorporates natural processes as well as native materials. Following are steps along that continuum, indicating approaches that might be followed in different contexts by a landscape architect.

Substitution of native species of trees, shrubs and vines for the more commonly used mix of natives, exotics and cultivars represents a first step in the continuum. For example, this might suggest using a native *Viburnum* species in place of the exotic *Photinia* species in a shrub group, or a native *Amelanchier* species in place of an Oriental cherry. With this approach, plant selection has been modified, but placement is similar to that in a conventional design. There is a tendency to have greater continuity with the surrounding natural landscape of the region because of the repetition of similar species. Furthermore, if the plants are placed in appropriate microhabitats, there is less need for supplemental watering, feeding and protection from temperature extremes than there would be for many of the introduced species.

The next step along the continuum might be the introduction of a diverse mix of native ground-layer species in appropriate microhabitats, replacing the mulch beds and monotypic ground cover and annual flower beds that are so abundantly used in standard landscape design today. The forms of mulch or ground-cover beds might remain very much the same, but the species makeup would change. For example, in a shaded area English ivy might be replaced by a mix of ferns and woodland wildflowers; in a sunny flower bed, a mix of native meadow or prairie perennials might replace the sequence of spring bulbs, summer annuals and fall chrysanthemums. Finally, the exotic irrigation-requiring lawn might be replaced by a native sod former, such as *Buchloe dactyloides* (buffalo grass) in some of the Great Plains states. Again, even though the design form may not differ significantly from that in conventional contemporary landscape design, the ground-layer planting, like the trees and shrubs in the scenario discussed previously, will bear some relation to the region's natural landscape and should result in reduced input of water, fertilizer and specialized management and maintenance procedures.

A third level of complexity in the continuum of natural alternatives is the utilization of communitylike groupings of native vegetations as design elements. At this point along the continuum, both the selection and placement of plants are related to the species composition and distribution patterns that occur in the natural landscape. Following this approach, in the portions of a designed landscape where three-dimensional mass and enclosure are among the design objectives, one might initiate a planting that will emulate the natural forest for the region and the specific habitat type, utilizing the most characteristic canopy, middle-story, and ground-layer species of that forest type in the planting. Because such plantings would rarely be equivalent in size or extent to the natural stands of that forest type, the species array in the planting might similarly be scaled down. But the key species, the plant density, and distribution patterns would ideally capture the essence of the natural model over time. Similarly, in meadowlike or prairielike plantings in sunny areas, the composition would ideally incorporate the visually important species, the characteristic grass, forb ration and distribution patterns in a naturally evolved meadow or prairie. The stylized, abstracted plant community groupings included in this approach might be used as borders and islands adjacent to mowed lawns in some contexts. Hence, this approach is not a total re-creation of nature.

Ecosystem restoration, with a reintroduction of a full array of native species and reinitiation of natural processes on sites that have been adversely affected by earlier human activity, represents the most complex end of the continuum. Initially such work may require the reversal of some effects of this earlier activity; e.g., eradication of exotic and aggressive plant species or rebuilding of an organic soil where it has been removed. Next, propagules of an appropriate mix of species need to be reintroduced, sometimes over a period of years, and the restoration is managed in methods emulating natural processes.

Learning From Natural Models

Even using the most elementary approach to landscape design with native vegetation, the designer needs to know something about the local natural landscape. For example, in the approach described as the substitution model, with native species of trees and shrubs placed in a traditional design form, the designer needs to know what is native locally. Although certain information can be learned from the literature, there is no satisfactory substitute for carefully observing the naturally occurring native plant communities of a region, if there are any preserved remnants.

Examples of information that can be obtained through such observation may include the following:

Species composition. One can sometimes obtain lists of native plants for a particular geographic area, but they only become meaningful to the designer when those plants are seen in their community groupings. Even identification becomes easier when one observes a particular plant repeatedly in similar environments. Even if it is unrealistic to expect to learn all the plant species in a community type, it is possible to learn dominant species, such as the major canopy trees in a forest community; prevalent species, which are those that occur with the greatest frequency; and visual essence species, those which may be important because of a distinctive aesthetic attribute (Morrison and Howell, 1983).

Distribution patterns. The distribution pattern of a particular species, as it occurs in nature, provides a very logical basis for placement of the same species in a designed landscape. Two aspects of distribution are particularly useful to observe: the distribution of a species relative to micro-environmental conditions and the degree of aggregation that is exhibited by the species.

One can learn through field observation which species have very narrow environmental amplitude (e.g., occurring only in very hot, dry situations or only in full sun) versus those which have a wide range of moisture or sunlight tolerance.

Besides these distribution tendencies, most plants exhibit a characteristic degree of aggregation. Plants are usually considered to exhibit one of the following three types of distribution: regular, random or aggregated (Curtis, 1959). Of these, it has been my observation that some degree of aggregation is the most frequently occurring pattern. The aggregation may be loose, as in the case of *Fagus grandifolia* (American beech) in the Midwestern beech-maple forest, or it may be much more highly aggregated, with many closely spaced individuals, as with *Betula nigra* (river birch) in the riverine forest of the same region.

Differing degrees of aggregation become particularly important in creating visible patterns in open prairie and marsh communities, where species that spread vegetatively typically form dense aggregations that feather out at the edge.

This phenomenon of having greater density toward the center of a group and more widely spaced individuals at the edges might be termed the drifing of a species.

Aesthetic characteristics. The aesthetics of naturally evolving plant communities are also best observed in extant stands of those communities. Among the noteworthy aesthetic attributes of naturally evolving landscapes that might be incorporated into designed ones are: spatial configuration, clumping and drifting of species, softness of edges and transitional zones, and diversity of colors and textures.

A recurrent theme in natural landscapes is the flowing space, an open space that bends out of sight and tends to have a degree of mystery. This characteristic is most obvious when it is embodied in a flowing river that curves, but it may also occur as an open space in an upland site.

Clumps and directional drifts of plants are common phenomena in naturally evolving landscapes. Clumps occur particularly with vegetatively reproducing shrubs and herbaceous plants which spread outward from a central nucleus. Typically, plants at the edges of shrub groups that spread in this manner are progressively shorter than those in the center, providing a rounding horizon. Drifts of one species often feather out and merge with a second or third species.

Edges between different species groups, then, tend to be indistinct. Where one community type meets another, there is frequently interpenetration, as where an oak-hickory forest meets a prairie in the Midwest.

The colors and textures of natural landscapes are often more subtle and more diverse than those of the standard designed landscape. Flowers in nature usually do not occur in the solid masses that tulips or geraniums occupy in the designed landscape. Except in a few cases, there are usually several species occurring together in nature, as in a prairie, where the bold colors of the forbs' flowers are filtered and made more subtle by the linear leaves of grasses. There are typically more seasonal changes of color in the natural landscape than in the traditionally designed one. Instead of the consistently green color of the designed landscape with its lawns and evergreen ground covers and shrubs, there are grasses that become dormant, subtle flower and seed head colors, and deciduous shrubs that change color and then lose their leaves. Texturally, the natural landscape exhibits greater variety than many designed landscapes because of the fine textures of ferns, grasses, hedges and rushes, and the bare twigs of deciduous shrubs, sometimes occurring as clumps or thickets.

Community dynamics. One of the most important lessons that can be learned from observation of natural landscapes is that they are always changing. There are often long-term successional changes occurring almost imperceptibly but also short-term changes resulting from phenomena such as an individual tree falling in the forest, an animal building a mound of fresh soil outside its burrow, or water changing levels in a marsh. Each of these phenomena provides information we need to know in designing and managing landscapes that display the forms and processes of natural landscapes.

Conclusion

In this article, I've tried to compare standard approaches to planting design with a series of alternative approaches and also to suggest that the best classroom for learning how to design with native plants and plant communities is the natural landscape itself.

The design, installation and management of naturally based landscapes holds great potential to provide a greater variety of designed landscapes, landscapes that are resource-conserving and that perpetuate regional differences. To be successful, it is essential that their designers understand not only artistic principles but also natural forms and processes. In the end, the ecological design may also be the most artful.

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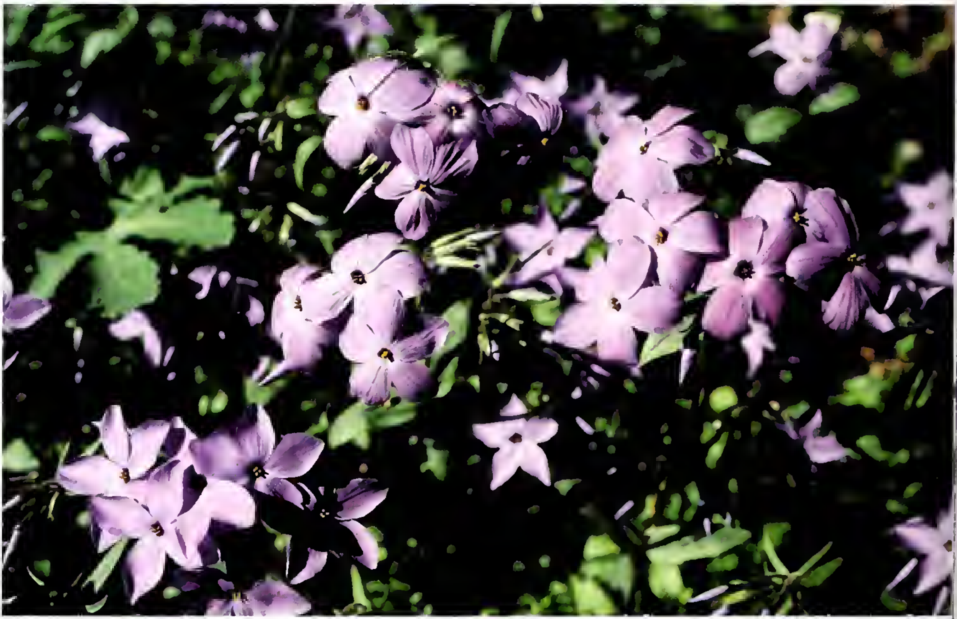
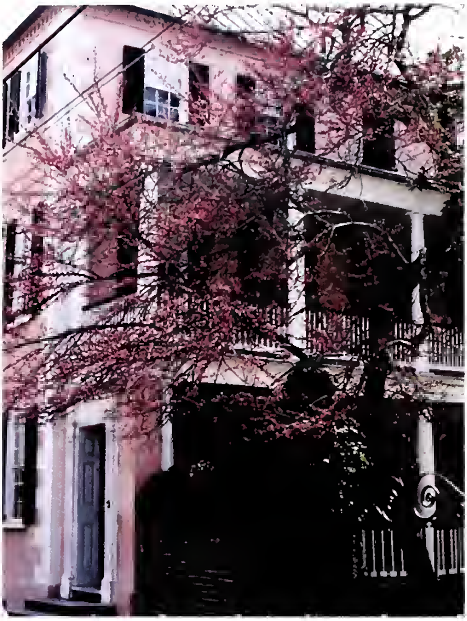


Phlox stolonifera 'Sherwoods Purple'at the Mt. Cuba Center. Woodland phlox makes an excellent ground cover. It has neat evergreen foliage just a few inches high and bears a profusion of flowers in May.

GREAT AMERICAN SMALL FLOWERING TREES:

TEN ALTERNATIVES TO BRADFORD PEARS

BOB HYLAND



Cercis canadensis

Trees between 20 and 40 feet in height with colorful flowers, fruit, bark and autumn foliage are in demand. Exotic species from the Orient such as magnolias, flowering cherries, crabapples, and Bradford pears have been popular for decades. However, there are choice ornamental trees with multiseason interest that are native to North America and rival their foreign relatives. The following are ten examples.

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Amelanchier arborea

(DOWNY SERVICEBERRY)

Several species of *Amelanchier* are confused in the nursery trade. Most are multistemmed shrubs, but *A. arborea,* native from Canada to Florida, Minnesota, Oklahoma and Louisiana, grows into a tree 20-25 feet tall. It flowers for a short time (5-7 days) in mid- to late-April, but the pendulous clusters of white flowers are quite showy. Their weak fragrance is unpleasant to some.

A bonus for gardeners (and birds) are the edible fruits that ripen from green to red and finally purplish-black by June. The fruits are the size of miniature blueberries, but are not on the tree long enough to be ornamental.

Young leaves are covered with gray, downy fuzz when they first unfurl in the spring, but the hairiness disappears as the leaves reach full size. The foilage turns dramatic shades of yellow, orange, and deep red in autumn, making downy serviceberry one of the finest native trees for fall color. Vertical ridges and furrows of light and dark gray on the bark provide some winter interest.

Downy serviceberry is rarely used as a specimen tree and is, perhaps, more suitable in informal groupings in a lawn or mixed tree and shrub planting.

Hardy in Zones 4-9, tolerant of a wide range of soils and easy to cultivate, downy serviceberry is, unfortunately, prone to leaf rusts, powdery mildew, Japanese beetles, mites and aphids. An integrated program of sprays and good culture should yield healthy, attractive trees.

Asimina triloba

(PAWPAW)

Our native pawpaw is a small tree with unusual flowers and large leaves that have a tropical appearance. It generally grows as a multistemmed understory tree in woodlands from New York to Florida and west to Nebraska and Texas. When cultivated as a single-trunked tree, pawpaw merits attention for many gardens.

Pawpaw reaches 15-20 feet in height and naturally assumes a pyramidal shape when grown in full sun. Waxy, purple flowers in May often go unnoticed as the tree begins to leaf out. They are worth close inspection for their bizarre color and shape and they show off best in the small garden.

Coarse, 6- to 12-inch-long leaves turn an excellent yellow in autumn. They obscure small, edible, greenish yellow fruits that ripen to brown as they fall. The bananalike taste appeals to some people, and selections are being chosen for larger fruit and more distinctive taste.

A. triloba is hardy in Zones 5-8. It is ideal planted alone or in small groups. Native summer and fall-blooming perennials like New England aster *(Aster novae-angliae)*, Michaelmas daisy (*Aster* cv.), goldenrods (*Solidago* spp.), ironweed (*Vernonia noveboracensis*) and Joe-Pye weed (*Eupatorium fistulosum*) make good companion plants. I have also seen a grove of pawpaws used effectively to define the edge of a parking lot at the Scott Arboretum on the Swarthmore College campus in Pennsylvania.

Trees prefer moist, fertile, slightly acid soils. They are difficult to transplant from the wild and should be purchased as balled-and-burlapped or container-grown stock. A word of caution! Pawpaws sucker from underground roots, but unwanted suckers are easily eliminated with a sharp spade or pruning shears.

Cercis canadensis

(EASTERN REDBUD)

Clusters of diminutive, rosy-pink flowers, heart-shaped leaves, and clear yellow autumn color characterize this small tree, hardy in Zones 5-9. It is an understory tree in woodlands from New Jersey to Florida, New Mexico and Texas. Taking a cue from its native habitat, plant redbuds in partial shade and either acid or alkaline, well-drained soils. Avoid lawnmower damage and improper pruning cuts which can provide entrance points for fungal organisms that cause cankers, a leading cause of branch dieback and plant death among redbuds.

The garden value of this tree is its lovely flowering in mid-to late-April. Tiny blossoms that have the characteristic form of other plants in the Pea Family (garden beans and peas) are reddish-purple in bud and open to a lighter pink. Pealike pods, two to three inches long, develop after flowering and ripen from green to papery brown. Pods are more visible during the leafless dormant season, but have limited ornamental appeal.

Redbuds usually develop into multiple-stemmed, spreading, flat-topped trees that branch close to the ground. Judicious pruning at an early age can easily create a single-trunked specimen for patios and outdoor areas. Underplantings of Siberian squills (*Scilla sibirica*)*, lungworts (*Pulmonaria* spp.)*, moss pinks (*Phlox subulata* cultivars), or periwinkle (*Vinca minor*)* give nice effects.

A white-flowered form (*C. canadensis alba*) is sometimes observed in nature and is available from some nurseries. There are a few other native redbud species that are more suitable for other regions of the country. *C. reniformis* is native to Texas and New Mexico and has thicker leaves and deep pink flowers. California or western redbud (*C. occidentalis*) is native to California, Utah and Arizona. Its leaves are bright green and differ slightly in shape and size from its eastern relative. The purplish-pink blooms are also slightly larger.

Chionanthus virginicus

(FRINGE TREE)

Native from New Jersey south to Florida and west along the Gulf Coast to Texas, the fringe tree is an aristocrat in the garden. The plant is a multistemmed, shrubby tree with sparse branching. A mature specimen is 15-20 feet in height with an equal landscape spread.

Fringe tree shows little sign of life until mid-to late-spring. Then drooping, white flower clusters emerge at the same time as new leaves and quickly cover the trees with a haze of white fringe. On a gray, overcast day a fringe tree can seem to shimmer in the landscape.

Trees have male or female flowers but not both. Male flowers are larger in size and the dense clusters are slightly more showy than the bloom on female trees. However, choose females if you are interested in the small, bluish-black fruits shaped like small olives. They are attractive for several weeks in early fall. Otherwise, yellow leaf color is the only autumnal reward.

Give fringe trees fertile, acid soils on the moist side. They will grow either in full sun or partial shade and are effectively used in small groups in an open lawn or as specimens in a mixed herbaceous border.

In the mid-Atlantic and northeast regions, bloom time corresponds with tall bearded (*Iris* cv)* and Siberian irises (*I. siberica*)* and field poppies (*Papaver rhoeas*)*. The most dramatic tree I have seen is planted over a patio and studio garden near Wilmington, Delaware. Its springtime flowering and excellent summer shade are unbeatable.

Cornus alternifolia

(PAGODA DOGWOOD)

The landscape value of pagoda dogwood is its distinctive architectural form. Branches spread horizontally in tiers, suggestive of an oriental pagoda. It grows in the wild from Canada south to Georgia and Alabama and west to Minnesota and is hardy in Zones 3-7.

Flat-topped clusters of white flowers bloom in the spring from mid-to late-May and are somewhat malodorous. They are succeeded by blue-black, berrylike fruits held on pinkish-red stems. While colorful for awhile, the fruits are not long lasting.

C. alternifolia is a worthy substitute for its native relative, the eastern flowering dogwood (*C. florida*). Its showy white spring bracts, colorful red fruits, burgundy-red autumn foliage, pebbly bark texture, and easy propagation have made the eastern flowering dogwood one of the most handsome and popular small trees in North America. However, many have been killed by anthracnose, a fungal disease that first spots foliage and, if left unchecked, invades and kills stems, branches and entire trees.

Crataegus viridis

(GREEN HAWTHORN)

Green hawthorn, native from Virginia to Florida and west to Illinois, Missouri, and Texas, derives its common name from the greenish gray of its bark. Yet there are other reasons why this tree deserves more use in gardens.

It is outstanding for its heavy fruiting, rivaling many of the more popular crabapples. Clusters of reddish-orange fruits (each about one-quarter inch in diameter) ripen between September and October. The persistent fruits retain this bright color into the coldest winter months of January and February. A tree showing off its red fruits against a fresh blanket of snow is a sight to behold!

This 20- to 35-foot hawthorn develops a spreading, vase-shaped branching pattern. Stems and branches contain sharp, 1 1/2-inch-long thorns, a drawback to some gardeners.

Flowering comes in mid- to late-May and lasts seven to ten days. White flowers with five petals are borne in two-inch-wide clusters and exude an unpleasant scent.

C. viridis is hardy in Zones 5-9 and is easy to grow in full sun and most soil types. Its only problems are susceptibility to rusts that can spot and discolor leaves and fruits and, perhaps, a tendency to develop weak crotches and narrow branch angles that lead to splitting and structural damage on older trees.

A selection, *C. viridis* 'Winter King', is available and offers larger, deep red fruits. It and the species are among the best native trees for the winter landscape and garden.

Franklinia alatamaha

(FRANKLINIA)

If for no other reason, grow as a conversation starter. It was collected along the banks of the Altamaha River in Georgia in 1770 by John Bartram, but has never been seen in the wild since 1790. Supposedly, all plants available today are derived from Bartram's original collection.

More than a botanical curiosity, franklinia is a spectacular tree for some gardens and hardy in Zones 6-8. It rarely exceeds 20-25 feet in height and its multiple trunks spread to about 20 feet.

The real appeal of this tree is its late summer and fall bloom, generally early August in the mid-Atlantic and northeast regions. The cup-shaped, white petals enclose a distinctive cluster of yellow stamens and exude a faint fragrance. The flowers do not bloom all at once, but open sporadically from early August through September. Bloom may continue even after the shiny, dark green, 5- to 6-inch-long leaves have colored shades of orange, burgundy and scarlet in October.

Other ornamental features of franklinia are the hard, round, nutlike fruits that cling to branches after leaf drop. Smooth gray bark broken with lighter vertical fissures offers additional winter interest.

Franklinias thrive in moist, acid, well-drained soils suggestive of their lost, native coastal plain habitat. They develop sparse fibrous root systems and are better purchased as small, container-grown plants Larger balled-and-burlapped trees are no easily transplanted into the garden.

To take advantage of its summer flowering, combine franklinia with late-blooming ground covers like white lilyturf (*Liriop muscari* 'Monroe White')* or striking blue autumn leadwort (*Ceratostigma plumbaginoides*)*. Variegated carpet bugleweed (*Ajuga reptans* 'Burgundy Glow') or late blooming hosta (*Hosta* 'Ginko Craig' or *H plantaginea*)* are other possibilities.

Oxydendrum arboreum, sourwood, is most dramatic in fall when its three- to eight-inch-long leaves turn brilliant red and purple.

Halesia tetraptera

(Carolina silverbell)
(incorrectly listed as *H. carolina*)

The diminutive, bell-shaped flowers of this small native tree are ephemeral but exquisite in the spring garden. It is seldom planted and deserves more attention.

The half inch, white bells develop in small clusters on year-old wood for one week in late April or early May. Suspended below branches, the flowers are best appreciated looking up into the tree canopy from underneath. A dark green background of conifers also accentuates the flowers when viewed from a distance.

Carolina silverbell is native to the East Coast from West Virginia to Florida and eastern Texas, and is hardy in Zones 5-8. Low, spreading branches form a broad, round crown. Mature landscape height is 30 to 40 feet, but the growth rate is no more than one foot per year.

Other ornamental attributes of this tree are its yellow fall leaves, papery brown four-winged fruits visible in fall and early winter, and ridged and furrowed bark alternating from light gray to brownish-black.

Silverbells transplant easily and prefer organic, acid soils. Full sun is best for flowering, but trees will tolerate partial shade. Carolina silverbell is a beautiful patio tree where its branches can spread horizontally and create an informal canopy. Pruning of lower branches will elevate the tree to a comfortable height for human activity below. Azaleas, rhododendrons and other broad-leaved evergreens are good companion plants. A ground cover of the native foamflower (*Tiarella cordifolia*) that blooms at the same time is one of the nicest plant combinations I have seen.

Magnolia virginiana

(SWEET-BAY)

Sweet-bay offers one of the most subtle, sweet, lemony-fresh fragrances among garden plants. Unlike its Oriental magnolia in early spring, sweet-bay allows the competition to pass before blooming. The creamy white flowers with nine to twelve petals open over a four to six week period from late May to early July. Since the flowers are not produced in great abundance, they do not make a color statement when viewed from a distance. The cone-like fruits that split open to reveal bright red seeds in August are more distinctive.

In northern areas (Zones 5-7), *M. virginiana* forms a small, multistemmed, deciduous tree not more than 20 feet tall. In southern regions (Zones 8-9) sweet-bays are semievergreen to evergreen and form larger, pyramidal trees. Varieties of sweet-bay with better form and semievergreen foliage are being selected and tested for hardiness in northern climates.

Sweet-bay is an excellent tree for small patios, decks and open-air porches. Site a specimen near an open window to take full advantage of the sweet aroma that wafts lazily on summer breezes. The handsome, dark green leaves also provide interest when the wind buffets and exposes their silvery undersides. Unfortunately, the foliage provides no autumn color.

Sweet-bays tolerate wet soils, shade and acid soils. The shallow root systems develop near the soil surface and should be mulched to keep them cool and moist and to prevent disturbance from cultivation. Vigorous new stems occasionally grow at the base of sweet-bays, but are easily pruned out.

Oxydendrum arboreum

(SOURWOOD)

Sourwood is truly a tree for all seasons in home gardens in Zones 6-9. Michael Dirr in his *Manual of Woody Landscape Plants* says that "many gardeners feel, among native trees, this is second only to flowering dogwood" (*Cornus florida*). I think it is equal to or better than flowering dogwood.

Its habitat extends from Pennsylvania to Florida, and west to Indiana and Louisiana. The tree naturally develops a pyramidal shape with drooping branches. It slowly grows to a maximum height of 30 feet in gardens and has a spread of 15 to 20 feet. A good plant for summertime bloom, sourwood sports drooping sprays of white flowers that cover a tree in a lacy veil from late June to early July. The tiny, individual urn-shaped blooms are reminiscent of lilies-of-the-valley.

During the remainder of the summer, flowers give way to yellowish-green fruiting capsules that gradually fade to brown. October may be the most dramatic time for sourwood when the lustrous dark green, three- to eight-inch-long leaves turn brilliant red and purple depending on weather conditions and siting. The sprays of tan fruits are dramatically accented by the vibrant foliage and provide winter interest after leaf drop.

Sourwoods are best transplanted as young trees. They demand acid soils (pH 5.5), perfect drainage and organic soils. A full sun exposure will ensure the best flowering and fall color. Heavy clay soils with poor drainage, drought and high pH lead to weak trees that never develop beautiful form or size.

Summer and fall-blooming perennials such as New England asters (*Aster novae-angliae*), daylily cultivars (*Hemerocallis*)*, black-eyed Susans (*Rudbeckia hirta*), and fall-blooming sunflowers (*Helianthus* x *multiflorus* 'Flore-Pleno') are potential combinations. Ornamental grasses are also ideal companions to sourwoods, especially variegated miscanthus (*Miscanthus sinensis* 'Variegatus')* and feather reed grass (*Calamagrostis acutiflora* 'Stricta')*.

Many of these native trees are available from local nurseries and mail-order companies. Check catalogs and ask your local garden center or nursery to order plants. These trees, while selected for small gardens, are ideal for all size gardens and will reward you with years of beauty.

*Editor's Note: These plants are not U.S. natives.

GREAT AMERICAN SHRUBS

Harrison L. Flint

Temperate zone North American shrubs can be divided into two groups: those we use well in the landscape and those we don't. Over a third of our "standard" landscape shrubs have their origins somewhere in North America, the others originating from some other part of the world or from hybridization, accidental or deliberate. If we consider the richness of the woody flora of North America, we have to conclude that we are not using this reservoir of plants very well. That is the problem, and the opportunity, we face.

The shrubs that follow form a partial list of great natives that, in my opinion, are not used often enough, nor well enough, and the accompanying comments suggest ways of improving the situation. This list, arranged alphabetically by scientific name could be expanded greatly, given sufficient time and space, but let this sample serve as a start. Any native plant enthusiast can do the expanding, and no doubt each person's list will be unique.

Aesculus parviflora (bottlebrush buckeye) is a great shrub for large-scale situations, with its pleasingly coarse foliage and solid visual mass. Add to that the spectacular flowering interest in midsummer, and it is hard to believe this plant is not used more often. Even the winter aspect of the plant is interesting, because of the tiered branching and upright, leftover flower stalks. Bottlebrush buckeye grows slowly when young and can be contained by pruning and digging-out sucker shoots in small-scale plantings, but it is most trouble-free, and perhaps most appropriately used, when massed in large plantings.

Arctostaphylos uva-ursi (bearberry) is an extremely hardy shrub when well established, and establishment is usually not difficult if a few preparations are made. First, start with pot-grown plants that are not excessively potbound. Amend the soil as necessary to ensure it is well drained. Extra watering may be necessary for establishment, but keeping the soil waterlogged can kill bearberry plants quickly. During the first year after planting, avoid any fertilization of the soil other than super- or treble-phosphate in the planting mix, and powdered sulphur if the soil reaction (pH) is initially above 5.5 or so. It is not absolutely clear that this plant needs such acidic soil, but since it is a member of the Heath Family (Ericaceae), acidification is at least a good "hedge". When established in the right soil, this plant grows so vigorously that it will need to be contained in small-scale situations.

Cornus amomum (silky dogwood) is one of several species of more or less red-twigged shrubby dogwoods, including *Cornus sericea* (red-osier dogwood), another North American native. Silky dogwood is a little less cold-hardy than red-osier dogwood, and more adaptable to southern landscapes (to Zone 9a). Its twigs are not as bright red as those of red-osier dogwood in late winter, but its fruits ripen a beautiful blue in late summer or early autumn. It is equally useful for naturalized landscapes or

Oakleaf hydrangea, *Hydrangea quercifolia*, is not fully top-hardy in zones 5b to 6b, but is still useful as a border shrub or in masses. Erect clusters of white flowers appear in spring.

as a visual screen in informal landscapes. The name silky dogwood refers to the fine silky pubescence on twig tips and underneath young leaves, and it can be distinguished from red-osier dogwood at any season by its brown, rather than white, pith.

Dirca palustris (leatherwood), native to northern swamps, is seldom used as a landscape plant, yet offers unique seasonal interest, in addition to its tolerance of poorly drained and calcareous soils. A slow grower, this shrub can be counted on to remain below eye level for many years, retaining its compact shape without pruning. Small, tubular, pale yellow flowers open in early spring, shortly before the leaves start to unfold, and so are noticeable at close range. Leaves emerge pale green, changing to medium green as they expand fully to become elliptical and two to three inches long. Stems are extremely pliable, giving the name "leatherwood", and have much the same appearance in winter as those of the deciduous daphnes, which are closely related.

Fothergilla species (fothergillas) have received increasing attention in recent years, but still are not as widely used as would be expected from their garden and landscape assets. These shrubs are prime contenders for attention in the landscape in two seasons. In midspring, their upright bottlebrush-shaped clusters of creamy white flowers add delightful color during leaf unfolding—color that combines wel with just about any other color. Yet autumn is this shrub's showiest season, as the neat soft green, witch-hazellike leaves turn to brilliant gold overlaid with scarlet in "good" years, and soft gold to orange in quieter times. Dwarf fothergilla (*F. gardenii* usually remains below three feet in height, slightly exceeding this eventually in shade, and has small flower clusters (just over an inch long), which become colorful before much leaf expansion has occurred. Flower clusters of large fothergilla (*F. major*) open a little later and are two to three inches long, in proportion to overall plant size. Large fothergilla is a magnificent shrub, useful for naturalizing, screening (but not quickly), or simply included in mixed shrub plantings for its distinctive landscape interest.

Hydrangea quercifolia (oakleaf hydrangea), native from northern Alabama, Georgia, and Mississippi, to Florida, is surprisingly useful in the North as well. Even though it is not fully top-hardy in Zones 5b to 6b, it is still useful there as a massing or border shrub below eye level. In Zones 5 and 6 its flower buds survive mild winters. Even when the tops are winterkilled to the ground, the hardy rootstock sends up new shoots rapidly in the spring, forming a three-foot mound of foliage by late summer. The coarsely handsome leaves turn russet-red by midautumn. In the more southern areas where it is native, oakleaf hydrangea makes a shrub six to eight feet tall, and even broader, with the added appeal of great erect clusters of white flowers in spring.

Hypericum species (St. John's-worts) of shrubs reliably remain below three feet in height without pruning, thrive in full sun, tolerate considerable dryness, and make an impressive show of golden yellow flowers in midsummer. Three North American species: *H. frondosum* (golden St. John's-wort), *H. kalmianum* (Kalm St. John's-wort), and *H. prolificum* (shrubby St. John's-wort) are pretty much interchangeable in gardens and landscapes in Zones 5-9, and Kalm and shrubby St. John's-worts are useful northward at least to Zone 4b. Kalm St. John's-wort is the northernmost in origin, native from Quebec to Michigan. It has narrow leaves, only one to two inches long, and usually grows only two to three feet tall, with flowers less than an inch across. Shrubby St. John's-wort, native from New Jersey to Georgia, is slightly larger in all respects, growing to three feet tall. Golden St. John's-wort, native from the Carolinas to Texas, has blue-green leaves up to three inches long, and flowers close to two inches across. The popular selection, *H. frondosum* 'Sunburst', has performed very well for ten years at Purdue University (Zone 5b), including two extremely difficult winters (1983 and 1985), and has produced a good show of red-orange autumn foliage in most of those years.

Ilex glabra (inkberry) is native along the Atlantic and Gulf coastal plains from the Canadian Maritimes to Texas. With such a great natural range, it would be surprising if plants did not vary widely in cold hardiness, and perhaps heat tolerance as well. Forms adapted to extreme southern and northern climates may have been selected, but if so are not generally known about, and landscape use of this species is most common in the Mid-Atlantic region. This is a handsome evergreen growing eight to ten feet tall in good soil, but amenable to pruning for size control where necessary. A better solution, though, is to use one of the slower-growing cultivars such as 'Compacta', 'Densa', or 'Nordic', which may become tall eventually but will remain much lower for years. Leaves of inkberry are only an inch or two long, flat and lustrous, producing a "flatter" surface appearance than those of the Japanese holly (*Ilex crenata*) cultivars. Like all hollies, this one is dioecious, but since its black fruits add much less landscape interest than those of the red-fruited species, it makes no difference, in many applications, whether male or female plants are used. The selection 'Ivory Queen', however, has ivory-white fruits, with special winter interest, so the presence of a male plant in its vicinity for pollination becomes important.

Myrica pensylvanica (bayberry) must have been one of the first sights the Pilgrims saw as they landed at Plymouth, since this shrub is so common on the North Atlantic seacoast from Nova Scotia to Maryland. Deciduous in the North and grading to at least semi-evergreen farther south, with two-inch leaves that are pleasantly aromatic when crushed, this handsome shrub is most useful as a massing plant, to be kept below eye level, when necessary, by pruning every five years or so. It can also be used as a specimen for accent or as a component of mixed-shrub plantings, for its unique foliage and fruiting interest. Female plants bear clusters of white-gray waxy fruits, which hang on the plant long after leaf-drop, and sometimes almost until spring. The heavy coating of wax that covers these fruits was extracted by boiling and used in candlemaking by early settlers, and this practice is still being carried out for the benefit of tourists who appreciate the bayberry aroma released as bayberry candles burn. Bayberry can convert atmospheric nitrogen to usable forms with the help of soil microorganisms, so it thrives in infertile soil, but it also grows well in the heavier, more fertile soils of most of the Midwest. As would be expected from its native habitat, it is unusually salt-tolerant, and tolerates dry soil as well, making it one of the most useful and troublefree North American shrubs, adaptable in Zones 5-9.

OEMLERIA CERASIFORMIS (Indian plum, formerly *Osmaronia*), is native to the coastal Pacific Northwest, and probably has its greatest landscape value there, although it might well be tried more fully in other regions. In *Gardening with Native Plants of the Pacific Northwest* (University of Washington Press, 1982), Arthur Kruckeberg points out that no other native shrub of the region "better celebrates the spring rebirth of our lowland landscapes." This shrub's small hanging clusters of white flowers, soon joined by the emerging pale green leaves, "light up the leafless woods" for several weeks in their native climate. Its half-inch fruits are interesting at close range, colorful in their yellow-orange stage in early summer, and interesting as they ripen deep purple in late summer.

PIERIS FLORIBUNDA (mountain andromeda) is one of the hardiest and most beautiful of all broad-leaved evergreens. It is native to the mountains of the southeastern United States but adapted in landscape usage to much of the northeastern U.S. as well, and even the Midwest in sites having acidic, organic soils and protection from wind and full sun in winter. This is a lower, more moundlike plant than its more popular Japanese relative, *Pieris japonica,* and it seldom grows above eye level except in very shaded sites. It flowers a little later than Japanese andromeda, holding its flower clusters more erect, and its uniformly dark green, slightly rugose foliage offers pleasing texture. Most important of all for residents of northern areas is its winter hardiness, to Zone 5a, assuming good site selection and soil that is acidic (below pH 5.5) and well drained, but not excessively dry.

RHODODENDRON CANESCENS (Piedmont azalea), native from North Carolina to Florida and Texas, is the most spectacular of the pinxterbloom-type azaleas. It produces masses of fragrant white flowers with pink tubes opening in early spring, before and along with the new foliage. Its useful range extends northward at least into Zone 6b in the East. In more northern areas where it is not hardy it can be replaced by the equally fragrant roseshell azalea (*R. prinophyllum*) or the pinxterbloom (*R. periclymenoides*) which typically lacks fragrance. Where it is well adapted, though, Piedmont azalea is a clear first choice in this group.

RHODODENDRON VASEYI (pinkshell azalea) is one of the most distinctive of all azaleas It is a native of North Carolina growing to ten feet tall in good sites. This shrub ha almost clear pink flowers in great number in midspring. Two other features give thi shrub special value: it thrives in fairly we soil and it has some of the best foliage character to be found in the deciduous azaleas. Use in place of the hybrid azaleas, especially in naturalized and informal landscapes.

RHUS OVATA (sugarbush) is one of three entire-leaved sumacs from southern California—native to Arizona and Baja California as well. Sugarbush is a densely compact shrub growing from three or four feet tall and wide in desert sites to at least twice that size in semiarid climates. Its two- to three-inch leaves are evergreen, leathery and deep green with red margins when young, rounded with pointed tips. Clusters of small red dormant flower buds add nterest at close range in winter, then open creamy white by late spring. Fuzzy red fruits develop, which in some years add color to female plants throughout the following winter. The lush green appearance of this shrub belies its tolerance of dry climates, and contrasts with its many silvery-gray companions on the desert. In spite of this ush look, sugarbush exhibits traits that suggest adaptation to dry climate: compact growth habit and thick, rounded leaves that cup downward, protecting the undersides of the leaves from wind. The closely related emonade berry (*Rhus integrifolia*) differs only in minor ways, and is interchangeable n the dry southwestern landscapes where hese shrubs are appropriately used.

SHEPHERDIA ROTUNDIFOLIA (roundleaf buffaloberry), unlike the more common pecies of *S. argentea* and *S. canadensis*, is evergreen, although it would be more descriptive to say ever-silver, since that is its olor year-round. This shrub grows to three eet, and forms a compact mound of oliage. Few shrubs better illustrate morphological adaptation to dry climates. This ompactness of foliage, the small, round, hick leaves, cupped downward, the dense mat of hairs on the lower leaf surfaces, and he reflective quality of the silvery scales hat give the foliage its striking color, all onserve water in the plant. This shrub is not widely planted as yet, even in its native region, and its adaptability to other regions is largely untested. In arid climates, it offers striking visual appeal, and its spiny twig tips should make it useful as a physical barrier that will remain low enough to see over.

SOPHORA SECUNDIFLORA (Texas mountain laurel, mescal bean) is a tall evergreen shrub, sometimes to 25 feet and treelike. As a member of the Legume Family (Fabaceae) it is not at all closely related to the eastern mountain laurel (*Kalmia latifolia*), and of course neither plant belongs to the Laurel Family (Lauraceae). Mescal bean grows wild on limestone soils from central Texas to New Mexico and into Mexico, and is included in southwestern landscapes for its beautiful blue-violet flowers, borne in nodding clusters in early spring, as new foliage is unfolding. Their sweet fragrance is pleasant in minor amounts, but can be overwhelming for some people. The fuzzy brown constricted pods that follow are interesting, but add little to the plant's landscape value, and since the seeds are poisonous, some prefer to remove the pods before they mature. The dark green foliage, though, is an asset year-round. This shrub is perhaps best used as a specimen for accent, or to add early spring interest to mixed plantings. It is tall enough to serve as a visual screen, but not dense enough without frequent pruning.

VACCINIUM PARVIFOLIUM (red huckleberry) ranges widely as a native shrub in the coastal Pacific Northwest and on the lower western slopes of the Cascade Range and northern Sierra Nevada. Its flowers are barely noticeable, but the small bright red fruits that follow in early sumer add interest and are excellent in preserves and pies. The most significant landscape feature of this plant, though, is its foliage. The small, delicate leaves begin to unfold by mid-spring, and form lacy layers on the finely twigged branches. It retains its bright, pale green color throughout the unfolding process and for some time thereafter,

Rhododendron vaseyi

eventually turning to soft green, but never the dark green of so many of its companion species found in the Pacific Northwest in late summer. Nothing brightens a Douglas-fir forest like this shrub, caught in a ray of light penetrating the dark woodland.

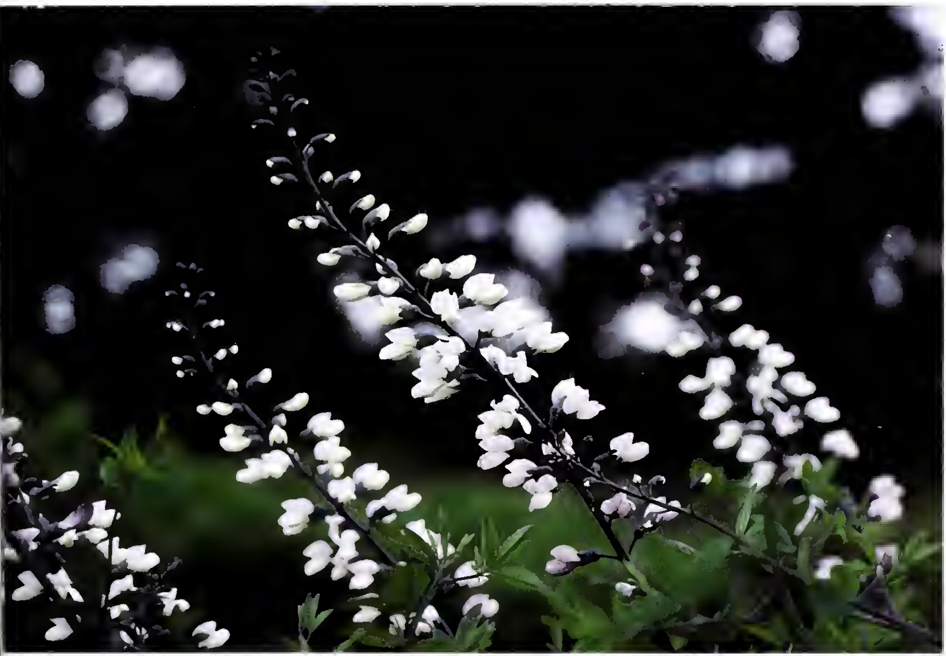
Viburnum rufidulum (southern black haw) is similar in many ways to the better known northern black haw (*Viburnum prunifolium*). It can be used as a large shrub or as a small patio tree. Both black haws are rather stiffly upright in their branching; both have excellent foliage with significant autumn color; and both become dense enough to make excellent hedges or informal visual screens. Southern black haw has more glossy, leathery foliage than its northern counterpart, and its fall foliage is magnificent—scarlet to mahogany leaves accentuated by highlights on the shiny leaves. Southern black haw is not as cold hardy as northern black haw, but plants have succeeded so far north of the native limits (southern Illinois to Virginia) that a cold-hardiness rating of Zone 6a seems conservative, and plants propagated from those of northern origin probably will withstand most Zone 5 winters.

Viburnum trilobum (American cranberry bush) is so similar to the more-often-planted European cranberry bush that some botanists have lumped them together as a single species. Yet there are a few differences. First, for native plant purists, American cranberry bush is indeed native across the North American continent, in the northern United States and most of adjacent Canada. Foliage of American cranberry bush is much more likely to color well in autumn than that of European cranberry bush. Timing of color is related to timing of acclimation in most shrubs, and so reflects on relative hardiness. But in this case, the difference in hardiness between the American and European cranberry bushes is of great concern only if you happen to live where average annual minimum temperatures are in the range of 40 to 50 degrees below zero. There, American cranberry bush clearly has the edge. Both cranberry bushes produce magnificent fruiting displays in autumn and well into winter, but the fruits of American cranberry bush are clearly preferred by makers of preserves.

All of these shrubs are functional landscape plants and all have distinctive visual character. They can be used in constructed landscapes in any appropriate sites within their native ranges, and many can be used far from home as well, since in virtually every case the useful range far exceeds the natural range. All can be used in traditionally designed landscapes or in restored plant communities, the ultimate in "natural landscaping" short of nature itself. The next step is to broaden this list for the region in which you live, and the ultimate challenge is to use your native shrubs well, whatever your design preference. ❦

STRIKING NATIVES FOR THE PERENNIAL BORDER

EDITH R. EDDLEMAN



For sheer elegance in the spring garden, few plants can compete with the white wild indigo (*Baptisia lactea*).

When the term "herbaceous perennial" is used, many plants which spring to mind are native American plants: urple coneflower, blazing-stars, black-eyed usans, Stokes' aster, New England aster (to ame a few), but as one horticultural wit ptly observed, we Americans often fail to notice the merits of our native plants until they have attended "finishing school" in English and European gardens. Sometimes easily propagated natives are not even available commercially in this country. For example, *Aster lateriflorus*, native from southeast Canada and Minnesota south to Florida, Missouri and Texas, whose tiny, white, autumn flowers have long been appreciated in English gardens, has only recently become available to U.S. gardeners (ironically from stock imported from

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England and Germany). Perhaps the public is not entirely to blame for this lack of observance, for it is only in gardens where soil is prepared well, adequate water is supplied, plants are well-sited, and competition is quelled that the full potential of our natives can be appreciated.

It is often said native plants perform better simply because they are native and, hence, "better adapted," ignoring the diversity of geographic and climatic conditions in this country. Being native does not necessarily ensure that a plant will be more tolerant of drought, poor soil conditions or inadequate light. While knowledge of the plant's natural range and the conditions under which it grows gives a good indication of conditions which it can tolerate, this is not necessarily a complete indication of the plant's adaptability. An example of this is *Lobelia cardinalis.* Naturally occurring in wet areas of the central and eastern U.S., often in partially shaded sites, this plant can be grown beautifully in full sun and drier garden soils. Another example is *Penstemon smallii*, native to a narrow geographical range in the mountains of North Carolina and Tennessee. This Southerner is hardy at least as far north as Zone 5 (though its strict requirement for well-drained soil makes it short lived in the landscape). When thoughtfully chosen, native perennials often prove to be surprisingly adaptable and are beautiful in combination with each other and with "introduced" or exotic species.

Most important to designing a border is careful plant selection. The first question to ask is: Is the plant appropriate to the garden site and conditions? If, for example, you are faced with a soil which is constantly moist but exposed to the sun, then it is best to work with plants such as *Vernonia* spp., *Eupatorium* spp., *Hibiscus moscheutos, Aster novae-angliae, Aster novi-belgii, Lobelia cardinalis, Filipendula rubra, Boltonia* spp., and others which tolerate, but do not require, wet soils. Once plant-site compatibility is achieved, the design elements of form, texture and color should be considered.

The shapes of plants provide the perennial border with a profile or cross-sectional form. The leaves and flower-bearing stems of these plants give geometric structure to the garden. Perennials generally have either vertical or horizontal growth habits but, for the purposes of design, it is useful to characterize their shapes as spiky, rounded (or oval), or creeping ("weavers").

Perennials with spiky leaves or flowering stems provide a strong vertical element in the garden. The leaves of *Yucca filamentosa* are a good example. When in bloom the tiered stalk of white bell-like flowers adds increased punctuation to the uprigh clump of evergreen foliage. Likewise, the stems of *Veronicastrum virginicum* rise t heights up to five feet, clothed in whorle dark green leaves topped by multi branched spires of small white flowers i mid summer. Other plants for vertica interest include the many species of *Liatris* *Physostegia,* foliage of *Iris virginica* and man native grasses such as *Panicum virgatum* Plants which offer vertical interest bu whose flowers are not in spikes include *Filipendula rubra,* with fluffy, wide-spreadin flower heads of tiny pink flowers borne o wiry stems above beautiful clumps of dee green foliage and *Eupatorium fistulosum* wit imposing dome-shaped dusty-pink flowe heads held 8-10 feet tall. *Baptisia* offer spikes of pea-shaped flowers in blue, whit cream or yellow (depending on th species) in mid- to late-spring; when out flower, their large rounded clumps foliage make a suitable background f other flowering perennials.

Other rounded forms are represente by *Amsonia, Boltonia asteroides,* many aste and *Euphorbia corollata* which, whil rounded in form, also functions in the ga den as a "weaver". Weavers are plants creeping habit such as *Verbena canadensis* plants with lax flowering stems such *Campanula rotundifolia* which cree through their garden companions without overpowering them. These can easily be distinguished from such beautiful "thugs" as *Oenothera speciosa* whose creeping rootstocks are capable of doing battle and winning against such well-known invaders as the non-clumping forms of *Artemisia.* In addition to their blending qualities, many creeping plants offer a textural contrast to the leaves and flowers through which they weave.

Texture is an important consideration in perennial garden design. Plants with fine textures—small, airy sprays of flowers or narrow leaves—recede visually. Coarse textures hold the eye. *Hibiscus moscheutos,* with ts large leaves and flowers is a good example of an eye-catcher. Changes in texture provide focal points in the border. For example, the bold golden daisies of *Rudbeckia fulgida* contrast with the delicate white flower sprays of *Artemisia lactiflora**. Adding another visual layer of texture to he garden are the airy "see-through" plants, such *Verbena hastata,* taller species of *Aquilegia* such as *A. canadensis* with red and yellow flowers or *A. chrysanthus* with yellow lowers, and *Gaura lindheimeri,* which soften hard edges and provide a sense of depth to he garden.

Color, like texture, can affect our perception of visual space and provide a focal point in the garden. Warm colors (red, yel-ow, orange) shoot forward, shortening pace. The use of large numbers of these warm-color flowered plants in a garden can make it appear smaller. Red, yellow and orange flowers and foliage colors are atten-ion-getting, providing intense natural focal points in the border. Native plants with red lowers include*Lobelia cardinalis* and *Silene virginica*; yellows are represented by the many *Solidago* species and *Helianthus* pecies. Natives with true orange flowers re less common, but *Asclepias tuberosa* and *Lilium superbum* are examples.

Cool-colored flowers and foliage (blue, purple, green) recede from the eye and are more restful and soothing. The use of these colors can create a sense of distance and give a soft, misty quality to the garden. Good choices of blue-flowered natives are amsonias, scutellarias, *Lobelia siphilitica* and *Phlox divaricata. Verbena, Vernonia, Liatris,* and *Aster* species provide many shades of red-violet or purple. Green, the most prevalent color in nature, is provided in a variety of shades and tints by the foliage of herbaceous perennials, trees and shrubs.

White- and silver-foliaged plants intensify our perception of the colors associated with them. Hence, the red flowers of *Lobelia cardinalis* look brighter when viewed against the white flowers of *Boltonia asteroides* than when seen against the more closely related color hue of the golden yellow flowers of *Rudbeckia.* Placing complementary colors side-by-side (red-green, blue-orange, yellow-violet/purple) also intensifies the color effect and forces the eye to pause and refocus, creating natural focal points. The use of closely related colors in association with each other, however, creates a color harmony which allows the eye to pass over it and is more restful, (for example, red, yellow and orange flowers used together or pink and lavender flowers used together.)

Bloom colors are not the only color factor in the perennial garden. Silver-foliaged plants such as *Artemisia stelleriana* and blue-foliaged plants like *Eryngium yuccifolium* have a brightening effect as do white flowers and complementary colors. Conversely, bronze, deep purple or brown-tinged foliage such as the chocolate-brown foliage of *Lysimachia ciliata* and purple-tinged leaves of *Viola labradorica* have a calming effect upon the colors adjacent to them in the garden.

The vast flora of the continental U.S. offers the thoughtful gardener almost unlimited choices of plants for the border, each of which can fulfill one or more of the design functions described above. The choices outlined below represent a few examples of fine native plants from which we can choose; many have a wide geographic range and are adaptable to all areas of the continental U.S. Others have a narrow range of distribution but have proven hardy and dependable both north and south of that range.

For sheer elegance in the spring garden, few plants can compete with a mature clump of ***Baptisia lactea*** (synonym *B. pendula*), the white wild indigo. In spring many succulent-looking charcoal-gray stems emerge from the earth; reaching a height of three feet, they are soon clothed in dark gray-tinged green leaves. Above the foliage are spikes of creamy white flowers which are a striking contrast to the gray stems. The flowers open over a period of two weeks. Growing in dry open woods and clearings from Florida north to North Carolina, *B. lactea* grows best in well-drained soils and is hardy to Zone 6. When grown in full sun in moderately fertile soil, it will produce many flower spikes and form a dense moundlike clump of foliage which creates an excellent background and contrast to other later-flowering perennials. Gardeners north of Zone 6 can substitute the equally beautiful northern species *Baptisia leucantha* growing to four feet tall with a natural range from Minnesota south to Texas. (Botanists now lump this with *B. lactea* although horticulturally there are distinctions.) The white spikes of *Baptisia* make a nice contrast with the rounded forms of shrub roses and with the rounded flowers and vertical foliage of Siberian iris in the spring border.

Deserving of more notice is ***Scutellaria incana***, the greater skullcap. Growing two to four feet tall, this beautiful perennial offers the gardener three-quarter inch, slightly fuzzy gray-blue flowers borne in spires from mid-summer to frost. If the foliage is cut back by half in early June, many more flower spikes will be produced, and the plant can be maintained at a height of two and one-half to three feet. A very hardy plant, it grows from Canada south to Virginia and west to Missouri. In the garden its soft blue flowers are especially beautiful in late summer if planted next to white flowers such as *Boltonia asteroides* or a large silver-leaved mound of *Artemisia* 'Silver King'. It is an especially good contrast in early fall to pink-flowered forms of *Aster novae-angliae* and with violet-colored, late-fall-blooming *Aster grandiflorus.* In July, a soft and misty effect can be obtained by interplanting clumps of *Scutellaria incana* with the lacy white flowers of *Daucus carota* (Queen Anne's lace).*

Welcome at the end of summer are the red-violet flowers of ***Liatris aspera***. Growing six feet tall, three-quarters of the stem is covered in compact bracted flower buds which appear to be carved from ivory and pale green jade. Even before it flowers, *L. aspera* offers a sculptural quality to the garden which shows off noticeably against a dark green background such as an evergreen hedge. All the bracts turn a red-violet just prior to the emergence of red-violet threadlike flowers. The fully open flowers resemble one-and-a-half-inch fringed buttons. The flower spikes are so heavy that staking may be required; a single tall stake per stem works best. The flowers combine well with pink-flowered asters or *Boltonia* and contrast beautifully with *Rudbeckia triloba*, a dainty black-eyed Susan blooming from late summer through frost with flowers standing from warm golden-yellow nea the black eye to butter-yellow at the tips o the petals. For a truly smashing effect, combine *L. aspera* with the airy pure-yellow Queen-Anne's-lace-like flowers of *Patrini scabiosifolia** (three to seven feet tall backed by the striking horizontally yellow banded foliage of *Miscanthus sinensi* 'Strictus'.* *L. aspera* grows in well-draine soils from Ontario south to Texas an South Carolina. For gardeners with dam soil, *Liatris spicata*, a southern wetland species hardy at least to Zone 3, woul work equally well in the garden.

A dainty *Liatris* look-alike is ***Carphephorus paniculatus*** (formerly *Trilisia paniculatus*), native to damp areas of the Southeast coastal plain but adaptable to drier soils. It is hardy to Zone 6, growing 12 to 24 inches tall in sunny locations. In early fall single spikes of soft red-violet flowers emerge from dense grasslike clumps of foliage. It can be planted with *Chrysopsis mariana*, a dryland species whose clusters of bright yellow flowers bloom at the same time as *Carphephorus*. A larger species of *C. odoratissimus* grows to three to four feet and is more cold hardy.

The southern perennial border is brightened in April by the pale, steely-blue flower clusters of ***Amsonia ciliata***. This native of the southeastern U.S. grows in the sandhills and in open sandy woodlands. Mature plants form dense clumps of stems clothed in narrow, dark-green leaves which add a fine texture to the garden. *A. ciliata* grows best in full sun and well-drained soil. In the spring garden, its blue flowers and fine foliage contrast beautifully with the yelow and green marbled foliage of *Sedum erythrostictum** 'Mediopictum', yellow-flowered *Aquilegia canadensis* 'Corbett' and the deeper blue flowers of *Sisyrinchium atlanticum* while the soft blue flower heads of *Phlox divaricata* repeat the blue of the *Amsonia* flowers.

Another choice native for the spring border is ***Phlox pilosa***. Given a sunny or semishaded location, this 18-inch-tall phlox bears fragrant clusters of white-eyed, mauve-pink flowers for two-and-one-half months. A wide ranging species, it occurs from southeastern Connecticut to southern Florida, west to Wisconsin and south to Texas. In the garden it combines well with he large fringed lavender-blue flowers of *Stokesia laevis* and spiky veronicas; it is even more pleasing when combined with the pale red-violet flower spikes of *Penstemon mallii.*

Phlox pilosa ozarkana is an 18-inch-tall phlox that bears fragrant clusters of white-eyed, mauve-pink flowers for two and one half months.

Penstemon smallii grows 18 to 24 inches all and bears spikes of flowers above dark green, red-backed foliage in late spring. If the old stalks are cut back, it will continue to produce new spikes through the summer. Occurring in a very limited range in lightly shaded woodlands and open banks in the mountains of North Carolina and Tennessee, it is surprisingly cold hardy (at least Zone 5). While flexible as to its light requirements, it requires sharp drainage and tends to be a short-lived perennial, requiring frequent division. It is easily grown from seed. In the garden, it combines well with the large yellow cup-shaped flowers of *Oenothera missouriensis* or the tall flat yellow flower heads of *Achillea* 'Moonshine'* and *Chrysogonum virginianum.*

Hundreds of one inch white daisylike flowers cover six-feet-tall plants of ***Boltonia asteroides*** during August and September. Native to damp areas of the central and southeastern U.S., *B. asteroides* adapts easily to dry soils and flowers best in full sun.

Prior to its bloom, the shiny silver-green foliage is an excellent foil for earlier blooming perennials such as *Echinacea purpurea.* A shorter selection of *B. asteroides,* 'Snowbank', grows to four feet. Combine the rounded form of *B. asteroides* with either of two blue salvias native to Texas, *Salvia azurea* var. *grandiflora* or *Salvia farinacea* and clumps of *Sedum* 'Autumn Joy'* for a pleasing late summer/early fall garden picture.

A soft pink-flowered form of *B. asteroides,* 'Pink Beauty', grows four feet tall. Plant it in combination with the shrubby *Lespedeza thunbergii**, whose drooping racemes of deep red-violet, pea-shaped flowers are a pleasing contrast to the rounded flowers and form of this *Boltonia.* The pink flower spikes of *Physostegia virginiana* contrast in form with both the *Boltonia* and *Lespedeza;* the colors of their flowers create a pleasing color harmony. Both *B. asteroides* and *P. virginiana* grow in wet soils but adapt to average to dry garden conditions.

Equally beautiful with *B. asteroides* is ***Vernonia noveboracensis,*** rising to a height of eight feet, depending on available soil moisture. Naturally occurring in wet meadows, stream banks, and roadside ditches throughout the eastern U.S., it bears dense clusters of tufted, deep violet flowers from July to September. Its tall, rounded form combines well with pink-flowered forms of *Aster novae-angliae* and the feathery pink-tinged flower panicles of *Eragrostis trichodes.*

ERAGROSTIS TRICHODES is native from Illinois west to Colorado and south to Texas. It grows four to five feet tall and flowers from July to September; it tends to be floppy and should be grown through a wire hoop to prevent it from smothering smaller plants located nearby.

Flowering for three to four weeks in early fall, ***SOLIDAGO RUGOSA*** grows four feet tall. This native of eastern woods, meadows, fields, bogs and pine barrens is as adaptable in the garden as it is in its natural range, tolerating either wet or dry soils. The many fine-textured, arching, single-sided panicles of small yellow flowers complement fall-flowering asters such as *Aster novae-angliae* and *A. pilosus.* Combine it with *Liatris aspera,* or the shorter *L. graminifolia,* or *Boltonia asteroides* for an elegant look, or contrast its rounded form with the flower spikes of *Lobelia siphilitica* or *Scutellaria incana.*

An unusual member of the aster family, ***ASTER CONCOLOR*** has upright stems two and one-half feet tall clothed in opposite, silky, gray-green leaves which are held vertically against the stems. At each leaf node is a single flower bud. In September, as these buds swell and begin to open, the stems arch gracefully in a cascade of deep violet-blue flowers. The flowers show off against the light gray-green foliage of wooly thymes and are equally beautiful spilling through the fluffy white clouds of *Euphorbia corollata.*

Often despised for its aggressive habits in the deep rich soils of the Midwest, ***EUPHORBIA COROLLATA*** can be a well-mannered and useful addition to the perennial border. Growing from Ontario south to Florida and Texas, this member of the spurge family will grow in almost any garden. It may take up to three years for the creeping rootstock to become thoroughly established and for the stems to reach three feet in height. The lax stems weave easily among other flowers or can fill gaps left by summer-dormant plants such as oriental poppies. The small greenish flowers are produced in summer months and are surrounded by long-lasting white petallike structures which give the plant its frothy appearance. *E. corollata* combines well with *Gaillardia* and *Rudbeckia fulgida* and is elegant in combination with blue salvias, *Platycodon grandiflorus** (balloon flowers) and silver-foliaged plants.

Two very different verbenas for the border are the tall ***VERBENA HASTATA*** and ***V. CANADENSIS*** (rose verbena). *V. hastata* forms clumps with stems three to four feet tall clothed in green-toothed leaves ending in a green upright spike around which appear tiny lavender-blue flowers. This verbena flowers from late May till frost with the flower spike elongating all the while. Its effect in the landscape resembles a soft blue mist and, despite it height, it is an excellent addition to the front of the border, softening the view of the plants behind it. It is tough enough to combine with such aggressive 'thugs' as the beautiful white-flowered *Lysimachia clethroides** (goose-neck loosestrife). Add to this combination clumps of *Platycodon grandiflorus*,* whose fat blue flower buds give rise to its common name, balloon flower, for a long-flowering midsummer combination.

Verbena canadensis is hardly to Zone 5 and is grown as an annual farther north. Its range includes the eastern seaboard from Virginia south, west to Iowa and Colorado and south into Mexico. In the South it bears clusters of fragrant flowers ranging from deep purple, dark and light lavender to pink, from early March to frost. In the milder parts of its range, its foliage turns a pleasing purple in winter, while in colder climates it may die back to the ground. In the garden this verbena seems to require dividing and soil replenishment every two years to assure the best bloom. For a spring effect, combine *V. canadensis* with *Phlox pilosus, Aquilegia* and *Iris tectorum**. Later in the year its rich purple flowers are an excellent complement to the golden flowers of *Rudbeckia fulgida* 'Goldsturm.'

Another little-known native, whose sprawling stems make it appear to be of creeping habit, is perennial blue day flower, ***Commelina erecta***, whose habit belies its name. Unlike its larger, weedy, introduced, annual cousin, *C. communis*, it is a fine addition to the border. Its ruffled petaled flowers are larger and of a softer blue than the annual species and are produced over a long period from midsummer through early fall (though each flower lasts but a single day). It grows from New York to Florida and west to Texas. Allow the stems of *C. erecta* to clamber around the gray-blue lance-shaped leaves of *Eryngium yuccifolium* and back up both with the soft yellow flowers of *Coreopsis verticillata* 'Moonbeam'.

Among the longest-blooming of plants for the border is ***Gaura lindheimeri***. It begins to flower in May while only 12 inches tall. Throughout its long season of bloom, the flowering stems continue to elongate, reaching six feet before frost finishes the last of its flowers. Seen from a distance, the plants have many stems bearing airy white flowers; on close examination the flower buds are tinged with red, and the old flower buds fade to a soft salmon-pink above green and red mottled stems. Fresh flowers are produced daily. *Gaura* grows on well-drained soils from Louisiana south to Texas and into Mexico; it is hardy as far north as Zone 6. It is important to site this plant carefully in the garden, for it produces a large woody taproot and resents disturbances. It is very tolerant of heat and drought. Grow it in the center of the border or near the front to take advantage of its see-through quality. Grown in front of a dark-flowered, dark-foliaged *Buddleia** such as 'Purple Prince', it is striking as it is rising from a mass of other white-flowered and silver-foliaged plants such as the white-flowered form of *Verbena tenuisecta**, *Euphorbia corollata*, and silver-foliaged *Artemisia* 'Powis Castle'*.

The plants mentioned above are only a small sampling of choice natives available for use in the perennial border so investigate the flowers of your region, and check the listings of the increasing number of nurseries which propagate natives for other ideas and suggestions. ❦

See Table on next page for the common names and USDA hardiness zones of all the native plants mentioned in this article.

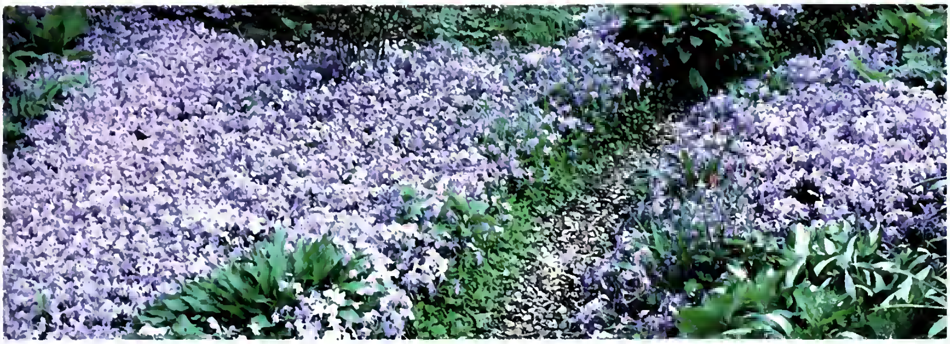
*Editor's Note: These plants are not U.S. natives.

TABLE 1

SUMMARY OF NATIVE PLANTS MENTIONED

Plants in boldface are featured in the article.

SCIENTIFIC NAME	COMMON NAME	USDA HARDINESS ZONE
Amsonia ciliata	**blue star**	**6**
Aquilegia canadensis 'Corbett'	columbine	2-8
Aquilegia chrysanthus	columbine	4-8
Artemisia stelleriana	beach wormwood	2-9
Asclepias tuberosa	butterfly weed	3-9
Aster concolor	**eastern silvery aster**	**5-9**
Aster grandiflorus	large flowered aster	7-9
Aster laterifloru s	calico aster	3-9
Aster novae-angeliae	New England aster	3-8
Aster novi-belgii	New York aster	
Aster pilosus	frost aster	
Baptisia lactea	**white wild indigo**	**6**
Boltonia asteroides 'Pink Beauty' 'Snowbank'	**thousand-flower aster**	**4-9**
Campanula rotundifolia	bluebells	2-8
Carphephorus odoratissimus		6
Carphephorus paniculatus		**6**
Chrysogonum virginianum	green-and-gold	4-9
Chrysopsis mariana	Maryland golden-aster	5-8
Commelina erecta	**blue day flower**	**4**
Coreopsis verticillata 'Moonbeam'	whorled tickseed	3-9
Echinacea purpurea	purple coneflower	
Eragrostis trichodes	**sand love grass**	
Eryngium yuccifolium	rattlesnake master	3-9
Eupatorium fistulosum	Joe-Pye weed	4-9
Euphorbia corollata	**prairie-baby's breath**	**3-9**
Filipendula rubra	queen-of-the-prairie	3-9
Gaillardia	blanket flower	7-9
Gaura lindheimeri		**5-10**
Hibiscus moscheutos	marsh mallow	5-9
Iris virginica	southern blue flag	
Liatris aspera	**button snakeroot**	**3-9**
Liatris graminifolia	blazing star	6-9
Liatris spicata	blazing star	3-9
Lilium superbum	Turk's cap lily	5-8
Lobelia cardinalis	cardinal flower	2-8
Lobelia siphilitica	great blue lobelia	4-8
Lysimachia ciliata		2-8
Oenothera missouriensis	Missouri evening primrose	3-9
Oenothera speciosa	Mexican evening primrose	5-9
Panicum virgatum	switchgrass	3-10
Penstemon smallii	**Small's beardtongue**	**5-7**
Phlox divaricata	wild sweet William	3-8
Phlox pilosa	**downy phlox**	**3-10**
Physostegia virginiana	obedient plant	3-9
Rudbeckia fulgida 'Goldsturm'	black-eyed Susan	4-9
Rudbeckia triloba	**black-eyed Susan**	**5-8**
Salvia farinacea	mealycup sage	7-9
Salvia azurea var. grandiflora	blue salvia	5-9
Scutellaria incana	**greater skullcap**	**2-6**
Silene virginica	fire-pink	3-8
Sisyrinchium atlanticum	blue-eyed grass	3-9
Solidago rugosa	**rough leaved goldenrod**	**4-9**
Stokesia laevis	Stokes' aster	6-9
Verbena hastata	**simpler's joy**	**3-9**
Verbena canadensis	**rose verbena**	**6**
Vernonia noveboracensis	**ironweed**	**5-8**
Vernonicastrum virginicum	Culver's root	3-9
Viola labradorica	Labrador violet	2-8



NATIVE PLANTS AS GROUND COVERS

SUGGESTIONS FROM A CONNECTICUT GARDENER

JUDY GLATTSTEIN

As any gardener knows, bare ground is an invitation for weeds to grow. If you do not mulch or plant, something will appear to occupy the open space. Use of plants as ground cover fills the space, and the plants serve to unify the garden. In addition, a drift or sweep of a single plant is visually pleasing. But not all plants are equally suited to function as ground cover.

Consider the dogtooth violet, ***Erythronium americanum***. The handsome mottled leaves appear early in spring. But this plant goes dormant by late May or early June. This means that the ground is bare throughout much of the growing season. Any of the spring ephemerals, those plants which flower early and then go dormant, are a poor choice for this purpose.

What then, are the parameters we should use? A ground-cover plant should have neat attractive foliage. If the leaves are evergreen then the plant will also be interesting in late fall and winter. Flowers are a bonus, but are too short-term to be the definitive criterion. The plants should be spreading. Then fewer plants are required in the beginning. It is rare that a plant will meet all the above suggestions. They serve as a means of comparing one plant to another, and making a decision as to which will be selected for use as a ground cover.

In the wild, plants grow in a particular

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area, referred to as their range. Certainly they can be expected to grow in other areas with similar conditions of soil and climate. Often, these plants will be genetically adaptable to somewhat different conditions as well. Plants from the Piedmont can grow in New England. Use the original range to start with and experiment from there.

One excellent choice is a woodland phlox, ***Phlox stolonifera***. It has neat evergreen foliage only a couple of inches high. The plants spread by surface runners which root down at the nodes. Flowers appear in May, carried well above the leaves. Color is typically a soft blue. Cultivars exist which provide the native plant enthusiast with lavender ('Sherwood's Purple'), pink ('Sherwood's Pink') or white ('Bruce's White') forms. This plant is easily propagated and relatively common in the nursery trade. ***P. stolonifera*** is found from Pennsylvania and Ohio south to South Carolina and Georgia.

Another favorite of mine is a non-flowering plant. This is the Christmas fern, ***Polystichum acrostichoides***. The lacy evergreen fronds provide winter interest. In the spring the new fronds, covered with chaffy brown scales, uncoil and unroll. The new fronds stand erect and graceful through the summer. Then in autumn they begin to arch over and assume a more horizontal habit. This fern does not run and spread; it does make ever-increasing clumps which can be lifted and divided to provide additional plants. This adaptable fern is found in the wild from Nova Scotia to southeastern Wisconsin, south to central Florida and eastern Texas.

The glossy green leaves of the Japanese pachysandra make it a popular component for many shady landscapes. This common species happens to have an American cousin. This is the Allegheny spurge, ***Pachysandra procumbens*** with softer, duller green foliage. Mature leaves exhibit a lovely mottling. This plant is evergreen in my garden (Zone 6), but is reported to be deciduous in more severe climates. Flowers are attractive fuzzy spikes like a white bottle-brush, in the spring.

P. procumbens is easy to propagate by cuttings taken in June. Use a gritty mix of equal parts sand and peat moss. Pack lightly into cell packs (those 6-compartmented units many annuals are sold in). Water well, then drain. Take the cuttings, wound each lightly down one side with your thumb nail. Dip in rooting hormone. Set the cuttings one to a compartment. Make arched supports from wire coat hangers. Cover a tray-full of six-packs with a clear plastic bag supported on the wire hoops so that is doesn't touch the cuttings. Set the "covered wagon" in a lightly shaded site out of direct sunlight. In a few weeks roots will form. This is an easy way to propagate many plants from cuttings. Our native pachysandra is found from Kentucky to Florida and Louisiana.

Mayapple, ***Podophyllum peltatum***, is a quickly spreading plant suitable for large areas. It is deciduous. Given a shady site with moist soil the leaves will remain in good condition through summer. Often the leaves will begin to yellow and go dormant in mid-summer if the soil is dry. The white flowers nod, and are hidden beneath the leaves. They are followed by attractive fruits which are not edible. May-apple is found from Florida to Texas, north to Minnesota and Ontario.

Another good shade-tolerant ground cover is ***Vancouveria hexandra***. Called American barrenwort, this plant is reminiscent of epimedium, another Japanese import. The dainty foliage is made up of three oval leaflets. The delicate appearance disguises an iron constitution. Given the humus-rich soil and woodland shade it needs, the plant is very long-lived and vigorous. Small white flowers in the spring are an extra bonus. A northwest native, ***Vancouveria*** grows wild in Washington, Oregon and northern California.

Foamflower, ***Tiarella cordifolia***, ha masses of small white flowers on a slender stem about eight inches tall in the spring. The leaves are dense and form a good cover in moderate shade. Spreading by surface or just-below-surface runners, foamflower will make a large colony. It is helpful if the colony is given a top-dressing (light sprinkling) of compost in early spring. Do not use fertilizer as the plant is easily "burned" and damaged foliage will result. Foamflower is native from Ontario south to Georgia and Alabama.

A small shrub which is useful as a ground cover is pachystima, ***Paxistima canbyi***. Growing about one foot high, this shrub does well in sun or light to medium shade with a sandy, peaty soil. The narrow evergreen leaves are slightly toothed near the tips. Grown where they receive some sun the leaves often turn an attractive bronze color in the fall. Flowers are inconspicuous. *Paxistima* is found on Appalachian mountain tops in Virginia and West Virginia.

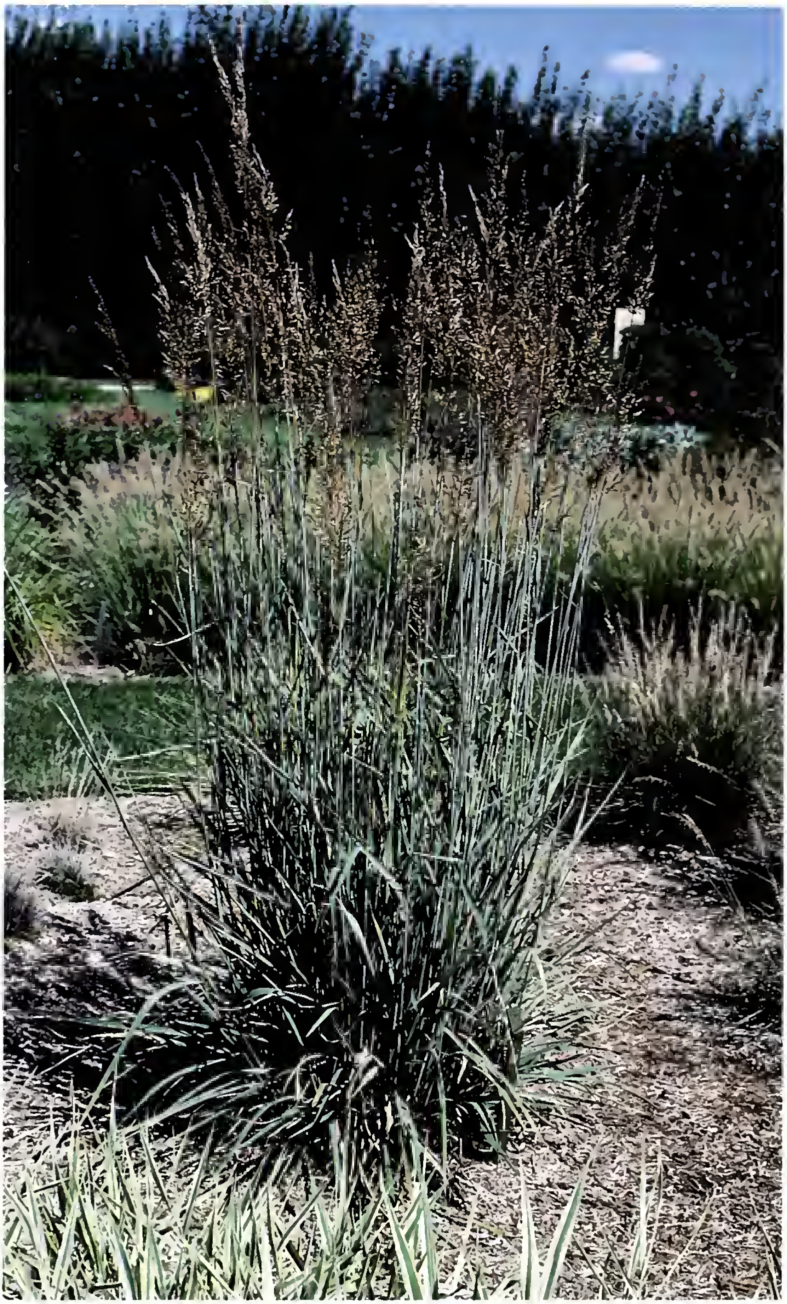
Another good choice for sun or light shade is green-and-gold, ***Chrysogonum virginianum*** var. ***australe***. This is the very low-growing form of the species. The dark green leaves make a dense mat. Small bright yellow daisy flowers make a good display in the spring and some repeat bloom in areas with cooler summers. In northern areas snow cover is important for winter survival. Green-and-gold is native from Pennsylvania and West Virginia to Florida and Louisiana.

In very sandy soil areas with full sun nothing is better than our native juniper, ***Juniperus horizontalis***. This standby of the nursery trade is available in several horticultural selections such as 'Bar Harbor' and 'Wiltonii' (also known as 'Blue Rug'). The needlelike foliage is a silvery-blue in the named forms, often turning to a purple-bronze in winter. Female plants have glaucous blue berries. *Juniperus horizontalis* has a native range from Nova Scotia to Alaska, south to New Jersey, Minnesota and Montana. Another useful species is ***Juniperus communis*** which is found in northern parts of Asia and Europe as well as North America. 'Gold Beach' is a creeping form with bright yellow-green needles which makes a dense, matlike ground cover. It is a selection from the Pacific Northwest.

Bear-berry, ***Arctostaphylos uva-ursi***, is good for full sun and a sandy peaty soil, but can be difficult to establish. Wintergreen, ***Gaultheria procumbens***, is a charming evergreen woody plant for a humus-rich acid soil in part shade. It does not make a dense cover without a lot of attention to top-dressing and mulching. Galax, ***Galax urceolata***, is a clump-forming evergreen plant with circular tooth-edged leaves which turn red-bronze in the fall. Minute white flowers are clustered on a long slender stalk. The clumps expand slowly and deer adore it. (Beware, this is a plant frequently dug from the wild and offered for sale.)

Wherever you intend to use groundcover plants, site preparation is very important. Dig over the entire area to be planted, removing competing weeds and roots. Add soil amendments such as compost as necessary. Set the plants with spacing adjusted for their growth habits—Mayapple further apart than Christmas fern for example. Water the plants well and mulch. Shredded leaves or rough compost or pinebark mulch are especially suitable in a woodland setting. The latter or gravel would be good in sunny sites. Pay attention to watering the first season, especially during summer drought. Watch, and remove any weeds that may grow the first season. Going into winter make sure that woody plants in particular are well-watered. If snow cover is limited, consider protecting new plantings with evergreen boughs or salt hay.

The use of ground covers to unify the garden scene, to display a specimen plant, to reduce maintenance, are all as valuable in a native plant garden as in any other type of landscape. ❦



Indian grass, *Sorghastrum nutans*, is near the top of the list of all garden grasses. 'Sioux Blue', a vegetatively propagated cultivar, has foliage of the softest powder blue. PHOTO BY RICK DARKE

NATIVE AMERICAN GRASSES

SUPERB LATE-SEASON PERENNIALS FOR THE GARDEN

RICK DARKE

Like ferns, perennial grasses are often overlooked when considering plants for the wild garden, yet much of the beauty of natural "gardens" across the landscape of wild America is due to the presence of our native grasses.

Grasses uniquely contribute a fine-textured, mostly vertical line, providing stunning contrast to broad-leaved companions. Sunlight plays wondrously through the narrow foliage, creating myriad changing patterns. Although individually minute, the flowers of many grasses are borne in profuse, upright clusters, their translucent parts glowing like candles in the setting sun. Grasses sway sensuously with the gentlest breeze, bringing movement and a delightful spontaneity into the gardened landscape.

Although most true grasses (members of the grass family, Gramineae) prefer sunny sites, they are otherwise very adaptable to a wide range of soil, temperature and moisture conditions, and are relatively disease-free.

Maintenance generally consists of cutting-back old growth once a year and occasional lifting and dividing of clumps. Seed propagation is easy in most cases although selected forms such as those having particular foliage colors are best propagated by division.

Grasses are particularly suited to wildflower gardens since they reach their peak during late summer and fall, a time when many more typical wildflowers, especially the spring ephemerals, are at low ebb. Summer foliage colors from lush greens to bright blue are often followed by autumn orange, red and gold. Flower tints range from silver to bronze. Many grasses are effective long after the growing season, and their winter hues of chestnut, almond, russet and fawn are excellent companions to brightly colored shrubs such as the red winterberry holly, *Ilex verticillata.* Here are some of the most interesting and reliable performers.

Many of the finest native grasses for gardens trace their origins to our once-vast tallgrass prairies and great plains, long since replaced by amber waves of exotic grain. The full range of native prairie species extends over much of the U.S., and includes some of our cold-hardiest grasses. Although requiring full sun, most are very drought-tolerant. Big bluestem, ***Andropogon gerardii***, a clump-forming giant, grows four to eight feet tall and in August produces three-parted flower heads resembling

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RICK DARKE'S *work as Longwood Gardens' curator of plants has taken him around the world in search of new plants for American gardens. His special interests nclude native American plants and ornamental grasses, both native and exotic. His home garden in Pennsylvania features wildflowers and grasses.*

turkey's feet. The foliage turns from rich green to copper-red in fall. Little bluestem, ***Schizachyrium scoparium***, formerly *Andropogon scoparius* is common in prairie remnants and dry hills over much of the eastern U.S. Usually under three feet in height, its dense clumps of fine-textured foliage are delightful in mass. Summer leaves vary from bright green to aqua blue, and autumn colors include every shade of copper, red and bronze. Along the upper part of each stem, silky-white seedheads glow in the sunlight from October through to the following spring. Cultivar 'Aldous' has glaucous blue leaves. Close relative broom sedge, ***Andropogon virginicus***, is not particularly associated with the prairie, but is native on open ground, sterile hills and sandy soil over much of North America. It is similar to but slightly coarser than little bluestem, and has many variant forms of garden interest.

An 18-inch fountain of the finest textured leaves springs from each clump of prairie dropseed, ***Sporobolus heterolepis***. Topped by delicately open panicles of flowers in early August, the foliage turns pumpkin-orange in time for Halloween.

Indian grass, ***Sorghastrum nutans***, is near the top of the list of all the garden grasses. A once constant companion to big bluestem in the tallgrass prairie, it is still found native in nearly every state from Arizona east. Strictly vertical in habit, it is variable in stature and foliage color. Indian grass can top six feet in the prairie but is more commonly four feet tall in the east. The medium-textured foliage is usually a deep green, but glaucous forms are frequent in prairie strains. 'Sioux Blue', a vegetatively propagated cultivar, has foliage of the softest powder blue. Indian grass produces golden-bronze terminal flower clusters beginning in late August. Hundreds of conspicuously bright yellow pollen sacs dangle on short threads from each cluster, tying in well with a lemon-flowered *Coreopsis verticillata* 'Moonbeam' that might be planted nearby. Fall color is a golden-orange.

In eastern meadows, Indian grass is often accompanied by purpletop, ***Tridens flavus.*** Flowering two to three feet tall from August to September, purpletop can truly put a purple top on sunny meadows, and is magnificent when it occurs in huge sweeps alternating with the golden-bronze of Indian grass.

Its flower stalks reaching seven feet in height, prairie cord grass, ***Spartina pectinata***, once covered hundreds of square miles in bottomlands too moist for other prairie grasses. Well adapted to average garden moisture, it spreads somewhat rapidly by rhizomes. Cultivar 'Aureomarginata' is a selected garden form with bright yellow leaf margins.

In nature, the tall prairie grasses were often accompanied by bold, broad-leaved plants including prairie dock *Silphium terebinthinacium*, compass plant *S. laciniatum*, and purple coneflowers *Echinacea purpurea* and *E. pallida*. Such plants make excellent garden companions to the grasses, providing a dramatic interplay of contrasting textures.

The Great Plains are drier than the tallgrass prairie, and grasses there are typically shorter-growing types. Two garden-worthy plains species belong to the genus ***Bouteloua***. At 12 inches tall, blue grama, also called mosquito grass, ***B. gracilis***, is among the shortest of our native ornamentals. Its curious flowers, beginning in June, are arranged like tiny brushes suspended horizontally from the tip of each stem. It is best in a sunny garden spot near a path or atop a ledge, where its detail can be closely appreciated. Side-oats grama, ***Bouteloua curtipendula***, is a useful medium-sized species suitable for mass planting. Starting in July, ruler-straight flowering stalks radiate from the relatively low-mounded foliage. Individual flower clusters are attached at an angle along one side of each stalk and are purple at first appearance, bleaching to sand. Additional stalks are produced through the rest of the growing season until a complete arc is formed. Side-oats grama is native over much of the central U.S.

The range of many grasses extends beyond North America to Europe and Asia. A familiar garden plant, the blue-leaved sheep fescue, ***Festuca ovina* var. *glauca***, grows natively in sunny open woods and stony slopes in our northwestern states, but is also widespread in Eurasia. Reed canary grass, ***Phalaris arundinacea***, is native to river banks and other moist, sunny places in most of our northern states, and is also a Eurasian native. Known as gardener's garters or ribbon grass, a form with boldly white-variegated foliage, *P. arundinacea picta* has been a popular garden plant for over a century. Wood millet, ***Milium effusum***, is native to both the northeastern U.S. and Eurasia. Cultivar 'Aureus' is valued for its bright charteuse leaves in early spring, which later darken to green. Another American-Eurasian native, tufted hair grass, ***Deschampsia caespitosa***, is useful for its evergreen basal foliage and fine-textured flowering effect. The striking gray-blue leaves of American dune grass, which is now considered to be of the same species as the European blue lyme grass, ***Elymus arenarius***, offer the opportunity for exciting combinations with summer flowers.

Switch grass, ***Panicum virgatum***, grows three to five feet tall in a variety of dry to moist habitats in nearly all states from Nevada east. Upright in habit, it produces masses of finely branched flower clusters by mid-August. In typical forms, the green leaves turn gold in autumn although selection 'Heavy Metal' offers steel-blue summer foliage, and the foliage of 'Hanse-Herms' turns deep burgundy-red in fall. Both are propagated by division. The unusually wide leaves of relative *Panicum clandestinum* (or *Dichanthelium clandestinum*, as this has recently been classified), deer-ongue grass, are responsible for the common name. Although it can be weedy in small gardens, the tawny mass of foliage persists attractively through winter in dry or moist meadows.

Bottlebrush grass, ***Hystrix patula***, appropriately named for the structure of its terminal flower clusters, and wild-oats, ***Chasmanthium latifolium***, which produces flat oatlike pendulous flower spikes, are native to woodlands in the eastern states. Both are well suited to shady gardens, although wild-oats does equally well in full sun with adequate moisture, its autumn leaves turning to gold and its flower spikes to salmon-brown.

American grasses, like much of our American flora, have been underexplored as to their garden potential, often being passed over in favor of exotic species. With renewed interest in our own floral heritage, many native garden gems are coming to light; for instance, a number of species of plume grass (*Erianthus* spp.) which inhabit moist soil on the Coastal Plain from New York south to Florida and west to Kentucky. Narrowly upright, and varying in height from six feet (bent-awn plume grass, ***Erianthus contortus***) to over nine feet (sugarcane plume grass, ***E. giganteus***), these elegant, stately grasses are topped by plumelike flower clusters which are effective all winter. Fall foliage is red to dark purple. All are well adapted to sunny positions in average garden soils.

Our West Coast flora also includes a number of clump-forming grasses, little-known but superbly suited to garden use. Highlights are: California fescue, ***Festuca californica***, with bluish leaves to two feet tall on dry open ground in Oregon and California; deergrass, ***Muhlenbergia rigens***, a southern California native producing whiplike flower panicles in summer or fall; and pacific reed grass, ***Calamagrostis nutkaensis***, a native from California to Alaska, whose reedlike flower clusters change gradually from purple-bronze to beige.

GARDEN IN THE WOODS

David R. Longland

Garden in the Woods is a dream in the realization, a year's long dream about a big wild flower sanctuary in which plants will be grown, their likes and dislikes discovered, and the knowledge gained passed on in an effort to curb the wholesale destruction of our most beautiful natives. This is to be our contribution to conservation." Proclaiming this their mission in 1934, Garden cofounders Will Curtis and Howard "Dick" Stiles began to gather and grow botanical treasures from all over North America.

Will Curtis purchased the Garden property in 1931, greatly inspired by its diverse, glacier-carved terrain of winding eskers, streams and kettlehole ponds. Trained as a landscape designer at Cornell University, Curtis felt strongly about the romantic appeal of naturalistic gardens. Dick Stiles, inspired by Curtis' enthusiasm and determination, became an avid horticulturist with a special flair for garden design. Over the course of four decades, these men established thousands of wildflowers, ferns, shrubs and trees in both natural and modified settings on this remarkable property.

Wild phlox and yellow lady's-slipper pro
a striking contrast in this woodland setti

In order to secure their "dream in the realization," Curtis and Stiles entrusted the Garden to the New England Wild Flower Society in 1965. The Society's chartered purpose was to promote the horticulture and conservation of native American plants through education and research. Today, as the Society's botanical garden and headquarters, Garden in the Woods contains the largest landscaped collection of wildflowers in the Northeast. The Garden has become one of the nation's chief conserva-

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David R. Longland, *as director of Garden in the Woods in Framingham, MA, oversees the management and development of garden programs and operations. He has special interests in native plants, garden design and habitat restoration.*

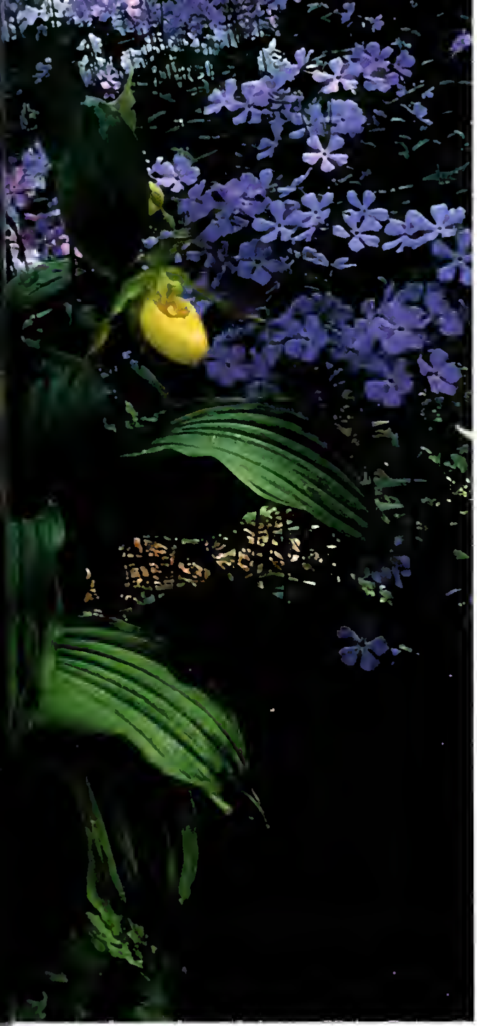

PHOTO BY HAL HORWITZ

tors of rare native plants, such as Oconee bells, (*Shortia galacifolia*), spreading globe-flower, and climbing fern (*Lygodium palmatum*). Also, the Garden is a showcase of unusual cultivars of wild plants like albino cardinal flower, (*Lobelia cardinalis* 'Alba'), double-flowered trillium (*Trillium grandiflorum* forma *petalosum*) and blood-root, dwarf hemlocks, (*Tsuga canadensis* cultivars), variegated wild oats (*Uvularia sessilifolia* 'Variegata') and many others.

Visitors who appreciate the regenerative spirit of nature and art will revel in a horticultural symphony of contrasting forms, textures and seasonal colors at Garden in the Woods. Trails meander over 45 rolling acres, where 1500 varieties of wild plants flourish in a series of specially designed, naturalistic gardens: Rich Woodland Groves, Lily Pond, Rockeries, Sunny Bog, Pine Barrens, Meadow, Western Scree and Laurel Bend—a unique display of drought-tolerant wildflowers for dry New England landscapes.

The Garden's horticultural staff grows both rare and common wildflowers for display, for sale to visitors, and for conservation and research. In keeping with the original purpose of Garden in the Woods, "the knowledge so gained" is disseminated through lectures and publications which promote the conservation of native American flora. The New England Wildflower Society sponsors a great variety of educational programs at the Garden, in response to the wide range of interests expressed by members and visitors.

From spring through fall, Garden in the Woods offers a kaleidoscopic succession of colorful wildflowers, including: liverworts (*Hepatica* spp.) and trailing arbutus (*Epigaea repens*) in April; lady's-slippers (*Cypripedium* spp.) and trilliums (*Trillium* spp.) in May; prickly pears (*Opuntia* spp.) and pitcher plants (*Sarracenia* spp.) in June; Turk's cap lilies, (*Lilium superbum*) and blazing stars (*Liatrus* spp.) in July; Cardinal flowers (*Lobelia cardinalis*) and turtleheads (*Chelone* spp.) in August; and aster (*Asters* spp.) gentians (*Gentiana* spp.) and brilliant foliage in autumn.

Garden trails are open daily from 9 a.m. to 4 p.m. *except Mondays*, April 15 to October 31, and an admission fee is charged to non-members. The offices and library are open Tuesday through Friday, 9 a.m. to 4 p.m. year-round. ❦

FOR MORE INFORMATION CONTACT:

Garden in the Woods
Hemenway Road Framingham, MA 01701
(617) 877-7630; 237-4924

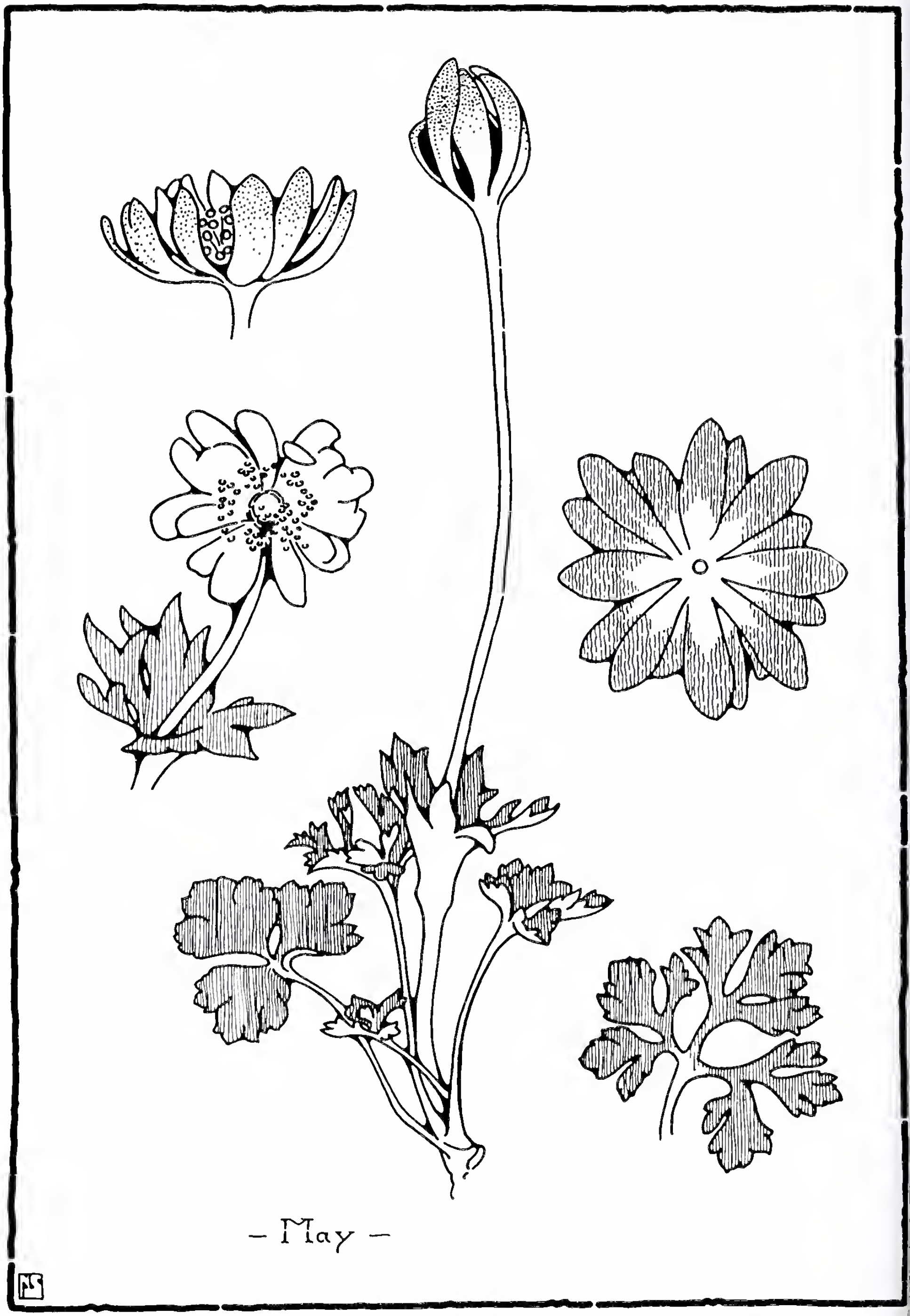

Illustration by Nettie S. Smith

NORTH CAROLINA BOTANICAL GARDEN

KEN MOORE

A visit to the North Carolina Botanical Garden will provide opportunities to enjoy and learn about native plants in a variety of natural and cultivated settings.

The Garden administers 598 acres of forests and open lands, much of which is managed to preserve the diversity of the regional flora and fauna for public appreciation and University teaching and research. Approximately 100 acres are traversed by nature trails through the local Piedmont forest. Ten acres are under intensive cultivation, including the Garden's historic and beautiful four-acre Coker Arboretum in the center of the campus of The University of North Carolina at Chapel Hill. At the time of this writing, the Garden, under the leadership of Garden Director, Dr. Peter S. White, is involved in master planning and landscape design work. This means by the time you visit, you may be watching the construction of a new visitors' center or the expansion of the native plant Habitat Gardens. At whatever time you may visit the Garden, you will see native plants in quantity, and staff or volunteers are available to provide answers to specific inquiries.

The Habitat Gardens are the heart of the native plant collections. Plants characteristic of the North Carolina mountains, coastal plain and sandhills are displayed in an acre of simulated habitat plantings. Walking through these distinct areas a visitor may experience a sense of being in the larger natural area represented. The Mountain Habitat Garden is a shady area of hemlocks and tulip-poplars with mountain laurels and rhododendrons providing a setting for many ferns and wildflowers characteristic of the western counties of North Carolina. Trilliums and other mountain wildflowers are at peak bloom during April and May each year.

The Coastal Plain and the Sandhills Habitat Gardens, both of which are open to the sun, make the Mountain Habitat Garden, in contrast, an inviting cool retreat during hot summer days. Fire is used as a seasonal part of the management of the Coastal Plain and Sandhills Habitats because, in nature, such habitats are subjected to fires on a much larger scale. Fire used as a management tool at the Garden demonstrates to the public that fires, in certain situations, are beneficial. In the case of the Coastal Plain Habitat, fire maintains the open habitat necessary for the survival of many wildflowers such as fringed orchids and pitcher plants. Visitors during September and October, even after early frosts, are surprised to find the Coastal Plain Habitat Garden at its peak with masses of blue, yellow and white flowers of species characteristic of the eastern lowland counties of the state. The Sandhills Habitat is characterized

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KEN MOORE *is assistant director of the North Carolina Botanical Garden. He has been a leader in work with native wildflowers and a major force behind the Garden's "Conservation through Propagation" and "Wildflower of the Year" programs.*

throughout the year by the exposed white sandridges towered over by long-leaf pines (*Pinus palustris*) and scrubby turkey oaks (*Quercus laevis*) so characteristic of this particular part of North Carolina.

Wildflower borders situated around the Totten Center visitor area are of peak interest beginning with wild columbine (*Aquilegia canadensis*) in April and ending with masses of goldenrod (*Solidago* spp.) and blue and white asters (*Aster* spp.) in mid-October. These wildflower borders demonstrate that there are many wildflowers and "roadside weeds" appropriate for home gardens and urban landscapes. The "Wildflower of the Year," a wildflower species selected cooperatively each year by the North Carolina Botanical Garden and The Garden Club of North Carolina, Inc., is prominently displayed in the wildflower borders. The "Wildflower of the Year" project is a conservation activity, one of many of the Garden's "Conservation Through Propagation" programs, which promotes an easy to propagate and cultivate North Carolina wildflower each year. For example, cardinal flower, *Lobelia cardinalis*, which was the first species selected, is displayed in several locations to attract hummingbirds from July through September. During the growing season, plants and seeds of the "Wildflower of the Year" are available to visitors.

The carnivorous plants are the most popular and entertaining. *Dionaea muscipula*, Venus's-flytrap, is the most famous plant at the Garden. It occurs throughout the Coastal Plain Habitat Garden, as it occurs in nature in the coastal plain of North and South Carolina and nowhere else in the world. It flowers in early June. There are numerous flytraps in the carnivorous plant display bed, where visitors, young and old alike, enjoy "fooling" the plants into action. Visitors learn how to trick the plant by reading the

Fall colors at the sandhills habitat section of the North Carolina Botanical Garden.

Photo by James War

labels placed around the display beds. The carnivorous plants collection at the Garden includes pitcher plants (*Sarracenia* spp.), sundews (*Drosera* spp.) and butterworts (*Pinguicula* spp.) native to the southeastern U.S. Visitors will learn that some are very rare and that the habitat of these interesting plants are generally threatened by various activities of society throughout our nation. The Garden's propagation program provides the visitor with opportunities to observe seedling carnivorous plants as well as hybrids.

Visitors interested in gardening with native plants will find a wealth of information by making inquiries of the Garden staff. Printed materials relative to wildflower propagation and cultivation, sources of plants and seed, and other pertinent information are available upon inquiry. A limited selection of propagated wildflowers are generally available for purchase through the courtesy of the Garden volunteers who are very active in supporting the propagation and conservation activities of the Garden.

Native plants are also displayed throughout the Plant Families Garden, where visitors observe that plants such as the native atamasco lily (*Zephyranthes atamasco*), garlic chives and asparagus are very closely related to the lily family. Another of many interesting families displayed is the aster, or composite family, which includes the goldenrods, ragweeds, blackeyed Susans and horticulturally bred marigolds and zinnias.

Native plants displayed throughout the Mercer Reeves Hubbard Herb Garden vary from poison ivy, oak and sumac (*Rhus* spp.) in the poison garden to Jack-in-the-pulpit (*Arisaema triphyllum*) which occurs in the poison, medicinal and American native herbs section of this comprehensive garden of plants of value for society.

Hours of visitation for the special collections around the Totten Center are Monday-Friday excluding holidays. Weekend hours from mid-March-mid-November are 10 a.m.-5 p.m. Saturdays and 2-5 p.m. Sundays.

Cardinal flower (*Lobelia cardinalis*) never fails to attract hummingbirds to the North Carolina Botanical Garden.

The Garden maintains an active schedule of educational programs, field trips and special events throughout the year. These are described in advance in the Garden's bimonthly newsletter which is distributed to members of the Botanical Garden Foundation.

Information on these activities and on scheduling group tours and appointments with staff may be obtained by writing the Education Coordinator, North Carolina Botanical Garden, 3375 Totten Center, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina 27599-3375 or by calling 919-967-2246 weekdays, 8 a.m. to 5 p.m. ❦

THE CROSBY ARBORETUM

PICAYUNE, MISSISSIPPI

CHRIS J. WELLS

With greater value being placed on our natural heritage, The Crosby Arboretum is a treasure of the Gulf South region. It allows us to learn about native plants and plant products so that we may use them to their best advantage while ensuring their genetic perpetuation. Through The Crosby Arboretum, aesthetic, agricultural, scientific and industrial contributions of native plants and ecosystems can be examined in a real-life setting.

Since its beginning in 1979, The Crosby Arboretum has become a premier native plant repository for the region. The Arboretum protects the region's biological diversity and provides a place for the public to enjoy plants native to the Pearl River Drainage Basin. The Crosby Arboretum uniquely provides for the study and enjoyment of plants in their original habitat.

The Arboretum consists of the 64-acre Pinecote, the Native Plant Center of The Crosby Arboretum, adjacent to Interstate 59 south of Picayune, Mississippi. The displays within the Center are naturalistic plant communities reflecting the beauty and diversity of the region. Each is designed to display the successional changes through which a natural plant system may pass. Fire is used at Pinecote and natural areas as an essential management technique for pine savannas and bogs.

Pinecote includes the Piney Woods Lake where native water plants furnish habitat for aquatic wildlife and waterfowl. Built to complement both artistic and functional aspects, Pinecote Pavilion was designed by internationally known architect Fay Jones, of Fayetteville, Arkansas. The pavilion, bridges and other architectural amenities are designed in harmony with nature. Thus, Pinecote is used for the quiet, reflective enjoyment of nature, as well as a gathering place for activities.

Other Arboretum sites, known as natural areas, allow the visitor to gain an appreciation of completely natural habitats. From sandy hills and open longleaf pine woodlands to slash pine savannas and exotic pitcher plant bogs, the fire-maintained communities provide a vigorous and ever-

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CHRIS J. WELLS *is the superintendent and botanist for The Crosby Arboretum. He began his formal botanical education upon leaving the U.S. Navy in 1974 and entering Northwestern State University in Natchitoches, LA. As an undergraduate he accompanied several botanical expeditions to Latin America. In 1984, he accepted his position with the Crosby Arboretum and received his masters degree in biological sciences from Mississippi State University.*

SAND-HILL SUNFLOWER

changing display of wildflowers. In contrast, the old-growth of cypress swamps, bottomlands and beech-magnolia forests protects flowers and wildlife rarely seen. Carnivorous plants and orchids are commonly found in many of the Arboretum's natural habitats. This vast assemblage of carefully selected and protected natural areas nurtures over 700 species of trees, shrubs, wildflowers and grasses found in the Pearl River Basin of southern Mississippi and southeast Louisiana.

The Arboretum maintains an expanding library, and a quarterly news journal informs members of timely happenings and helps readers gain knowledge of the natural environment. *Arboreports* are short, serial reports on sharply focused topics which include garden concept, resource management, environmental issues and scientific research. Special publications include the Native Plant Series consisting of the *Checklist of the Woody Plant Species of the Pearl River Drainage Basin* and the *Guide to the Natural Areas of The Crosby Arboretum.*

The Arboretum Gift Shop offers objects created by regional artisans including pine needle baskets and other articles relating to botanical themes.

Educational programs focus upon the arts, sciences and the humanities. The Arboretum also provides mini-grants to aid teachers in developing programs that will enhance their students' opportunities to learn about and experience the natural world.

The Crosby Arboretum is founded on the philosophy that plants are more than attractive features of our landscape; plants are an integral part of the environment; our own survival will be threatened if they do not flourish. Therefore, mankind's best interests can be served by the study of our plant neighbors with which we share this planet. ❦

FOR MORE INFORMATION CONTACT:

The Crosby Arboretum
1801 Goodyear Boulevard
Picayune, MS 39466
(601) 798-6961

THE ARBORETUM AT FLAGSTAFF

ARIZONA

WAYNE A. HITE

PHOTO COURTESY OF THE ARBORETUM AT FLAGSTAFF

The Arboretum, with its wondrous view of the imposing San Francisco Peaks, was established in 1981 as a center for native plant research and exhibition. Located just outside Flagstaff, Arizona, the Arboretum occupies 200 acres of ponderosa pine forest land at an elevation of 7,150 feet and includes a fascinating diversity of plants native to alpine tundra, coniferous forest and high desert. The Arboretum is also involved in a nationwide program for conservation of threatened and endangered plants.

The northern Arizona climate is a challenge for local growers. The area is characterized by spring droughts, summer rains and cold, snowy winters. The site can experience a frost during 11 months of the year. The humidity is quite low each day. These climatic conditions have made it difficult to grow many of the widely cultivated species of plants.

At the Arboretum, we are promoting many native shrubs and herbaceous plants now offered at regional nurseries. Of particular note are the many species of penstemon (*Penstemon* spp.) and columbine (*Aquilegia* spp.). Found throughout the 170,000-square-mile Colorado Plateau, these hardy species offer a wide variety of flower colors and plant sizes.

We've also introduced gardeners to the

WAYNE HITE *has bachelor and masters degrees in forest ecology. He worked in forest land management, planning and research prior to becoming the executive director of The Arboretum at Flagstaff in 1985.*

The Arboretum occupies 200 acres of ponderosa pine forest land at an elevation of 7,150 feet.

ocal ground cover, pussytoes (*Antennaria* pp.). Low-growing, gray-green-leaved erennials, these species are well adapted o the intense sunlight, extreme temperaure ranges and low annual precipitation of orthern Arizona.

Endangered plants are mixed into the lantings on the grounds. They include hrubs such as Arizona cliff-rose (*Cowania ubintegra*) and Arizona willow (*Salix arizon-a*) and herbs exemplified by Goodings nion (*Allium goodingii*) and San Francisco eaks groudsel (*Senecio franciscanus*).

The Arboretum is located at the crossoads of many interesting vegetation types iat typify the high elevation and dry envionments of the American West.

The Arboretum reaches schoolchildren, gardeners and scientists through educational programs. Large-scale community events are scheduled during the summer to teach people about the value of resource conservation and the richness of the Colorado Plateau flora.

The Arboretum is open Monday through Friday, 10 a.m. to 3 p.m. year-round and on Saturdays in June, July and August. ♥

For more information contact:
The Arboretum at Flagstaff
P.O. Box 670
Flagstaff, AZ 86002
(602) 774-1441

RESTORED PRAIRIES OF THE UNIVERSITY OF WISCONSIN MADISON ARBORETUM

VIRGINIA M. KLINE

Prairie wildflowers abound in the restored prairies of the University of Wisconsin Madison Arboretum and are easily observed from the firelanes and walking trails. Here plants with unfamiliar names such as rattlesnake master (*Eryngium yuccifolium*), prairie dock (*Silphium terebinthinaceum*) and prairie gayfeather (*Liatris pycnostachya*) grow among big and little bluestem (*Andropogon gerardii* and *Schizachyrium scoparium*), prairie dropseed (*Sporobolis heterolepis*), Indian grass (*Sorghastrum nutans*) and other prairie grasses much as they did when the first settlers arrived here 150 years ago.

There are over 300 plant species in Curtis Prairie and Henry Greene Prairie, the largest of the Arboretum's restored prairies. Curtis Prairie (60 acres) is the oldest restored tall-grass prairie in the world. Once cropland, it was a horse pasture when acquired by the Arboretum in 1933. Planting of prairie sods, seedling transplants and seeds was accomplished with the help of Civilian Conservation Corps (CCC) labor in the late 1930's. This is the site where some of the earliest prescribed burning experiments were carried out, which demonstrated the beneficial effects of fire and laid the groundwork for the widely adopted prescribed burn practices of today

Henry Greene Prairie (40 acres) wa named for the botanist who almost single handedly planted the prairie, most of i between 1945 and 1952. While Curti Prairie is on silt loam soils, the soils in Greene Prairie are sandy, varying from ver dry to wet, or poorly drained clay. This provides habitat for many species that do no grow in Curtis Prairie.

The objective of the Arboretum prairi

VIRGINIA KLINE *is staff ecologist and research program manager at the University of Wisconsin Arboretum. She is a community ecologist who received her Ph.D. in botany from the University of Wisconsin-Madison in 1976. Much of her research relates to the restoration and management of natural communities. For the past 11 years she has coordinated research at the Arboretum and has been responsible for planning and evaluating the management of the Arboretum's collection of biotic communities.*

restoration is to re-create a small sample of the once widespread but now rare prairie community, for use in teaching and research. It is a complex community of plants and animals, and attempting to put the parts together has led to greater understanding of the interactions of the plants and animals and their environment.

Prairies are dominated by grasses, and more than a dozen species of grass can be found in the Arboretum prairies. Tallest and most characteristic of the tallgrass prairies is big bluestem or turkeyfoot grass. On the deep silt loams of Curtis Prairie it grows eight feet or more in a good year after a spring burn. Other tall species include Indian grass and switch grass (*Panicum virgatum*), and, on wetter soils, bluejoint grass (*Calamagrostis canadensis*) and cordgrass (*Spartina pectinata*). However, perhaps more suitable for most home prairie gardens are the shorter species. These include little bluestem, prairie dropseed, sideoats grama grass (*Bouteloua curtipendula*) and the small panic grasses (for example, *Dichanthelium leibergii* and *D. oligosanthes*).

Interspersed among the grasses are species of many other families, composites and legumes being particularly well represented. All are adapted to drought, wind and high light intensity. The plants grow close together, with as many as ten different species in a square yard. Flowering is staggered among the species, so that the prairie changes in aspect as the season progresses and something is always in flower. In general shorter plants flower early and tall plants later. The seedheads of those that have matured and the foliage of those yet to flower add interest and diversity.

Prairies require no fertilization or irrigation, but burning is essential. Each Arboretum prairie is generally burned (twice) in a three or four year period, usually in early spring when the plants are dormant. Early spring burns stimulate growth and flowering of the grasses and many of the wildflowers, so the prairies are most showy the year of a spring burn.

The Grady Tract at the University of Wisconsin Madison with butterfly weed, pearly everlasting and false indigo in bloom.

Among the earliest flowers in spring are pasqueflower (*Pulsatilla patens*, formerly *Anemone patens*) and bird's foot violet (*Viola pedata*), which grow in dry sandy soil. Soon to follow are prairie smoke (*Geum triflorum*), with its unusual closed red flowers and rosettes of hairy, dissected leaves, the blue spikes of lupine (*Lupinus perennis*) and the pink and white shooting stars (*Dodecatheon meadia*) with their gracefully reflexed petals, the flowers held high above the basal rosette of ephemeral leaves.

Early summer brings tall white wild indigo (*Baptisia lactea*, formerly *B. leucantha*) and other legumes: leadplant (*Amorpha canescens*) with attractive gray foliage and small purple flowers, and the prairie clovers (*Dalea purpurea* and *D. candida*—both of these were formerly in the genus *Petalostemum*) with short spikes of magenta or white flowers held above finely divided leaves. Butterflyweed (*Asclepias tuberosa*) adds a splash of intense orange. In July the open clusters of small, pure whit flowers of flowering spurge (*Euphorbia corollata*) appear; their delicate texture wil enhance the prairie for many weeks. Rattlesnake master, a strange plant with leave like a yucca and tight spherical heads o greenish white flowers also begins to flowe in July.

The big show of composites begins wit pale purple coneflower (*Echinacea pallida* and early sunflower (*Heliopsis helianthoides*) to be followed later in summer by yello coneflower (*Ratibida pinnata*), vivi magenta spikes of gayfeather, and the ta stalks of yellow sunflowerlike heads of co pass plant (*Silphium laciniatum*), and prairi dock. The huge basal leaves of both co pass plant and prairie dock tend to b oriented so that the narrow edges face th noon sun, thus avoiding direct sunlight the hottest time of day. Their size, shap and orientation make the leaves conspic ous in the prairie throughout the summer

The Henry Greene Prairie at the arboretum is filled with many different grasses. Here the large leaves of prairie dock, *Silphium terebinthinaceum*, stand above the grasses.

Ten species of asters, such as smooth ster (*Aster laevis*) and New England aster *A. novae-angliae*), and seven species of oldenrod, including stiff goldenrod (*Soldago rigida*) with its flat-topped nflorescence, and showy goldenrod (*S. peciosa*) with its spikelike one, are conspicuous composites in late summer and fall.

While individual species are interesting, nd many (including those mentioned ere) can be grown in the garden, it is the ombinations of grasses and forbs, varying n space and time, that give the prairie its istinctive appeal. Walking the trails hrough the Arboretum prairies, visitors re given a chance to observe and enjoy any of these combinations, which may rovide inspiration for natural landscape lantings and prairie gardens.

The University of Wisconsin-Madison rboretum is unique in its emphasis on estoration of native communities. Although there is a 60-acre horticultural area, the Longenecker Garden, with an outstanding display of lilacs and flowering crabapples, most of the 1,280-acre site is used for the development of examples of the different types of forests, savannas, prairies and wetlands that were present in presettlement Wisconsin. These areas are used for teaching and research, with special emphasis on the restoration process. Free public tours are given on weekends. During the summer, the prairies are highlighted. Group tours can be arranged. Maps and information are available at the McKay Center in the Arboretum. ♥

FOR MORE INFORMATION CONTACT:

The University of Wisconsin
Madison Aboretum
1207 Seminole Highway
Madison, WI 53711
(608) 262-2746

THE CONNECTICUT COLLEGE ARBORETUM

NEW LONDON

SALLY TAYLOR

The Connecticut College Arboretum was established on 64 acres by George Avery in 1931 in southeastern Connecticut outside the small city of New London. The original plan of the Arboretum "dramatized an existing grove of ancient hemlocks which grew atop a 40-foot granite cliff." The hemlock grove was given to the College in 1911 by a New London family who had owned it since the 1600s; the land was originally bought from Owaneco, the son of the Mohican Indian Chief Uncas. The ravine, cliff and hemlock setting dominated the old farm site (which was crossed by colonial stone walls) with its dramatic, magnificent granite outcroppings and glacial boulder train. The topography was well suited to become an arboretum, with gently rolling hills and small valleys. One rock-strewn depression, a red maple swamp, became a pond when the small stream was dammed and seasonal flooding created a focal point and backdrop for subsequent construction of the formal entrance opening onto the stately Laurel Walk.

The only building in the Arboretum is Buck Lodge, constructed of fieldstone and cedar, which is nearby the Outdoor Theatre. The Lodge, which has simple facilities and a magnificent stone fireplace is available to the public by arrangement through the Botany Department Office. The Outdoor Theatre was created with stage, "wings" and seating area to serve as a location for dance production and College exercises. In 1938, a hurricane struck New London directly, and all but six of the 130 magnificent hemlocks up to three feet in diameter were blown down. Only those growing within the ravine were spared. As time passed, regeneration of th oak/beech/maple forest surrounding th hemlocks repaired the scars, and little evi dence of the disaster remains except fo the massive throw mounds and decaye trunks of the fallen giants. Paths lead to th area from the Williams Street entrance Today the Arboretum has grown to appro imately 425 acres, including habitats a diverse as a true bog and a salt marsh cor necting a rocky wooded island in th Thames River to the mainland.

The plant collection's emphasi remains the study and preservation o woody species native to New England. Th 20 acres closest to the Main Entrance an the Laurel Walk contain flowering shrul and trees of the rose, legume, heath an honeysuckle families as well as a woodlan wildflower garden which is connected to newly created Conifer Garden.

The azalea collection includes all of tl native species which will grow in our are The original plantings of pinxter flow (*Rhododendron periclymenoides*), rose-sh azalea (*R. prinophyllum*), swamp azalea (*viscosum*) and flame azalea (*R. calend laceum*) flank paths leading past the Lau

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SALLY TAYLOR *has been in the Department of Botany at Connecticut College for 25 years and associated with the Arboretum for 20 years. Her special interests are native azaleas and the use of native shrubs and trees in ornamental garden plantings. She has also served as a guest editor for* ***P&G.***

Walk with its backdrop of massive rosebay rhododendron (*R. maximum*). These 50-year-old plants flower during May and late June in the high shade of large tulip trees and red maples. A newer collection includes rhodora (*R. canadense*), plum leaf azalea (*R. prunifolium*) and coast azalea (*R. atlanticum*) as well as evergreen Carolina rhododendron (*R. carolinianum*). The plum leaf azalea creates a startling display of orange-red flowers in late July and August.

Early to mid-June is the best time to visit the new collection of mountain laurel cultivars (*Kalmia latifolia*), which flower at the same time as the plants along the original Laurel Walk. The wild laurels with pale pink to deep pink buds and flowers have been hybridized by Richard Jaynes and others to produce plants with scarlet buds and lowers intricately banded in red. Leaves vary in shape and color from normal, dull-green oval to narrow, willowlike and glossy.

One demonstration naturalistic landscaping area contains native silverbell *Halesia tetraptera*, formerly *H. carolina*), lowering in May, yellowwood (*Cladrastis kentukea*) flowering in June, and sourwood *Oxydendrum arboreum*), flowering in August. A second larger area feaures high-bush blueberry (*Vaccinium corymbosum*), and a 50-year-old huckleberry *Gaylussacia baccata*) clone which has been maintained by techniques of naturalistic andscaping pioneered by the Arboretum.

The favorite shrub of the Arboretum ollection is the native highbush blueberry. We call it the aristocrat of our native shrubs ecause of its broad seasonal interest which ncludes red winter twigs, small bell-like owers in spring, glossy foliage in summer, lue fruits and colorful foliage in fall. The lueberry branching structures is naturally ontorted because the twigs have false terminal buds, each year growing at a slight ngle from the stem, creating a zig-zag ppearance to the branches when they are oung. Mature plants may be pruned to mphasize this character. We feature several of these older plants in the Naturalistic Landscape areas, and blueberries have been used successfully as ornamental plants near campus buildings. Highbush blueberry is not a clonal plant and it tends to remain single-stemmed, unlike its cousins of the blueberry barrens of northern New England.

The notable small tree to see in the Arboretum in fall and late summer is sourwood (*Oxydendrum arboreum*). Long after most flowering trees have made their showing, its long slender clusters of white bells appear, giving a clue to its relationship with the native andromeda. The appearance of the flowers in late July is a welcome addition to the sequence of flowering trees. The flowers are followed by small capsules which persist until the leaves have dropped, giving the tree the unusual appearance of continuous flowering. The leaves are long oval, glossy green, and somewhat leathery. They begin to turn to the characteristic deep red by the first of September, and remain on the tree making a brilliant show until the last fall color has gone from the landscape.

Sourwood ranges in size from a large shrub to a medium-sized tree and is unusual in flowering profusely when it is young and small. Its form tends to be narrow and vertical when young, with leaves clothing the branches low to the ground, so it rapidly makes a satisfactory specimen tree. Coloring is most brilliant in full sun, less so in semi-shade. ❦

Literature Cited

The Connecticut Arboretum: Its First Fifty Years, 1931-1981 Bulletin 28, Connecticut College, New London. 1982. 56 pp.

FOR MORE INFORMATION CONTACT:

Glenn Dreyer, Director
Connecticut College Arboretum
Connecticut College
New London, CT 06320
(203) 447-1911, x7700.

WILDFLOWER AND NATIVE PLANT GARDEN

BRANDYWINE CONSERVANCY

BRANDYWINE RIVER MUSEUM,

CHADDS FORD, PA

F. M. MOOBERRY

Surrounding the Brandywine River Museum is an extensive wildflower and native plant garden which exemplifies the Brandywine Conservancy's purpose to preserve, utilize and display artistic, natural and historical resources of the Brandywine region.

The display garden is filled with wildflowers that are easy to grow and suitable for property owners to raise in their gardens. Plants are chosen to match the habitat rather than changing habitat to suit the plants. A large number of sun-loving species grace the parking lot's islands and are an important and integral part of the native plantings. A succession of blooming plants begins early in April with bloodroot, *Sanguinaria canadensis*, and ends in late November with the last wildflower of the year, fringed gentian, *Gentianopsis crinita*.

The artists represented in the fine arts collection of the Brandywine River Museum often used wildflowers as subjects. Many of these wildflowers are included in the garden.

Blooming shrubs and native flowering trees add to nature's pulsebeat as spring unfolds. Bluebells, *Mertensia virginica*, gro in beautiful profusion on the floodplain o the Brandywine and are featured plants o the spring wildflower garden. Their trum petlike flowers are pink in bud and the turn sky blue as they open. A native plan that adapts well to the home garden, thi perennial becomes dormant, dying back t the ground and vanishing completely fro sight by midsummer, not emerging until i purple leaves and buds break through so the following April.

Foamflower (*Tiarella cordifolia*), wil bleeding heart (*Dicentra eximia*), green an gold (*Chrysogonum virginianum*), wild gi ger (*Asarum canadense*), wood popp (*Stylophorum diphyllum*), Jacob's-ladde (*Polemonium reptans*), Miami mist (*Phacel purshii*) and native azaleas (*Rhododendr* spp.) are additional spring favorites.

All regional habitats are represented the garden, from full sun to deep shad rich to thin sterile soils, from dry to stan ing water sites. An essential part of t garden is the Museum parking lot's wat run-off retention basin which varies

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F.M. MOOBERRY *has been coordinator of horticulture for the Brandywine Conservancy and River Museum, Chadds Ford, PA since 1977. Her responsibilities involve both cultivated and natural areas; she manages design, maintenance and propagation for wildflower and native plant gardens. She conducts environmental impact surveys and provides meadow-management expertise for Conservancy and other lands. She is author of Brandywine Wildflowers and co-author of Grow Native Shrubs in Your Garden.*

At the Brandywine Museum a succession of blooming plants begins early in April and ends in late November with the last wildflower of the year. Blooming shrubs and native flowering trees add to nature's pulsebeat.

lepth and provides a habitat for spring's vild blue iris (*Iris versicolor*), golden ragwort *Senecio aureus*), and summer's swamp rosenallow (*Hibiscus palustris*), followed by fall's ardinal flower (*Lobelia cardinalis*) and blue obelia (*L. siphilitica*), all species that love noisture.

Summer brings the brilliant butterfly veed (*Asclepias tuberosa*) as well as the urk's-cap and Canada lily (*Lilium superum*) and (*L. canadense*), wild bergamot *Monarda fistulosa*) and blazing star (*Liatris picata*).

Four plants sharing the same common iame, black-eyed Susan, are all in the enus *Rudbeckia* (*R. hirta, speciosa, triloba* nd *fulgida*). These plants provide an xtended sequence of blooms of different rms, textures and sizes.

The month of September is host to New ork ironweed (*Vernonia noveboracensis*) and e-Pye weed (*Eupatorium fistulosum*). Connuing in bloom from late summer are the ng-flowering trumpet vine (*Campsis radians*) and turtle head (*Chelone glabra*).

New England aster (*Aster novae-angliae*) nd the frost asters (*Aster* spp.) combine ith goldenrods (*Solidago* spp.), which loom in both sun and shade, for a gloriius finale in October and November.

Over 250 species of wildflowers, shrubs and trees are to be found in the gardens, all easily propagated and adaptable for use by home gardeners.

The Conservancy's volunteers promote the conservation of wildflowers and native plants. To accomplish this important goal, the garden volunteers collect, clean and package over 100 different wildflower seeds. These are used for growing plants for the garden and are also packaged for sale to the public in the Museum shop.

Another important objective is the propagation program of native plants which culminates in a popular May plant sale. This sale enables the home gardener to purchase plants that were grown from seed rather than collected from wild populations. The volunteers also maintain a garden cart full of blooming plants which are available for purchase during the remainder of the gardening season.

Guided garden tours are available. ♥

For more information contact:
The Brandywine River Museum
Brandywine Conservancy
Route 1 and Route 100
Chadds Ford, PS 19317
(215) 459-1900

NATIONAL WILDFLOWER RESEARCH CENTER

BETH ANDERSON

Lady Bird Johnson and a corps of concerned citizens created the National Wildflower Research Center in response to a growing awareness that our native vegetation was rapidly disappearing. The inaugural gift establishing the Center came from Mrs. Johnson in the form of $125,000 and sixty acres of land on the Colorado River near Austin, Texas.

The Wildflower Center is dedicated to promoting the preservation and increased use of wildflowers and native plants. The Center's primary focus is on research and education. Of the some 20,000 species of flowering plants in North America, only a fraction have been studied in depth. Landscaping success with wildflowers and native plants is not always predictable, as so little is known about their cultivation. More research is needed. Through experiments at the Center and in cooperative projects across the country, a database of information is being established. By studying the growth habits and requirements of our native species we can learn more about how to use them in commercial and residential landscapes.

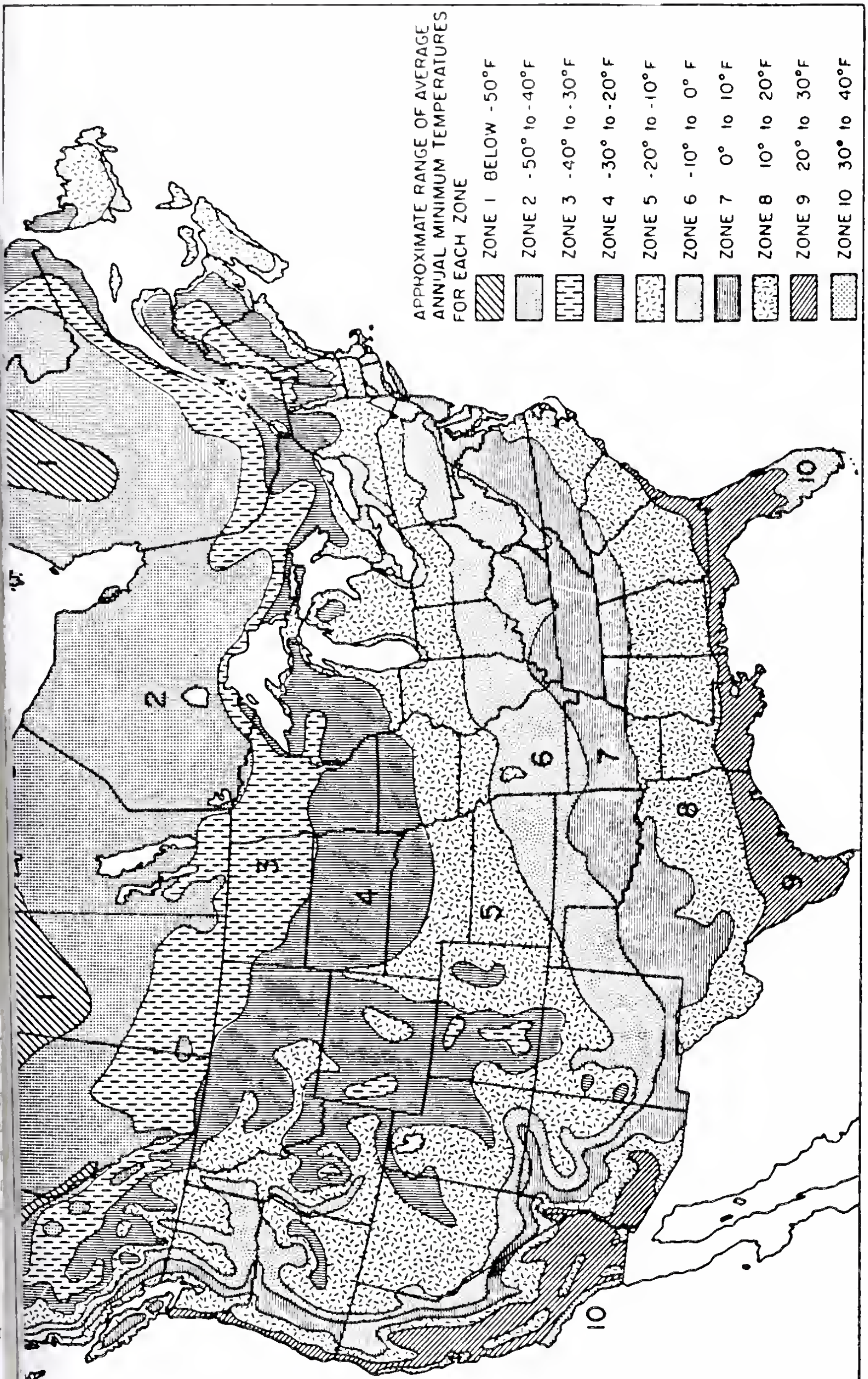
The Wildflower Center's Clearinghouse serves as a network to join individuals and organizations working with native plants, by gathering up-to-date information on current research and wildflower projects in each state. This information is compiled into fact sheets on seed sources, recommended species, appropriate planting procedures for different regions of the country and additional resources for wildflower information. The Clearinghouse contains an impressive technical library and an extensive slide collection.

The Wildflower Center is working to preserve America's rich heritage of wildflowers and native plants. Increasing the use of hardy, drought-resistant, indigenous native plant species will allow us to have the best of all worlds. We can enjoy our landscaped areas; we can protect our water supply; we can increase ecological stability; and we can preserve the genetic information essential to the continued existence of native plants and our future utilization of them. Using native plants indigenous to a particular area also helps "each state to speak in its own regional accents," as Mrs. Johnson says.

In our efforts to educate the public about the need to protect and conserve this diminishing natural resource, we have developed a strong national membership program. A broad spectrum of professionals, and wildflower and native plant enthusiasts learn more about our native flora through membership in the Wildflower Center. Members receive a bimonthly newsletter; a biannual wildflower journal, written for the layman reduced rates on educational seminars; and discounts on Center products.

Visitors to the Center can see over 300 labeled species native to the immediate region in designed landscape settings, in naturalistic community groupings — including a small established native prairie — and in more formal display plantings Our research test plots and a new "Pollinator Garden" are also open. The Wildflowe Center has color from late Februar through November and fact sheets an slide shows are offered year round.

FOR MORE INFORMATION CONTACT:
National Wildflower Research Center
2600 FM 973 North
Austin, TX 78725 (512) 929-3600


APPROXIMATE RANGE OF AVERAGE ANNUAL MINIMUM TEMPERATURES FOR EACH ZONE
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ZONE 5 -20° to -10°F
ZONE 6 -10° to 0° F
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HELPFUL LISTS OF SOURCES OF NATIVE PLANTS

NURSERY SOURCES: NATIVE PLANTS AND WILDFLOWERS, 1987, 72 pages.

Compiled by the New England Wild Flower Society, Inc., Garden in the Woods, Hemenway Road, Framingham, MA 01701. Sections include a list of popular native plants and nursery sources; a list of 58 nurseries propagating native plants for Zones 4-6; and a list of other nurseries selling propagated native plants. Available for $4.95. This booklet has been updated on an annual basis.

SOURCES OF NATIVE SEEDS AND PLANTS, 1982

Available from the Soil Conservation Society of America, 7515 Northeast Ankeny Road, Ankeny, IA 50021-9764. Single copies $3.50 postpaid. Contains 272 different sources listed by state with comments describing the type of material they offer.

A SOURCE BOOK OF INFORMATION ON HORTICULTURALLY USEFUL NATIVE OR NATURALIZED PLANTS OF THE SOUTHEASTERN UNITED STATES, 1985, 87 pages.

James H. Horton, Editor. Prepared and published by Western Carolina University. Sections include: a list of individuals who have expertise in using native plants for beautification; a list of institutions that can serve as resources; a list of sources for native and naturalized species; a habitat key; and a list of references.

SOURCES OF NATIVE PLANTS AND WILDFLOWERS

A three-page list of sources of seed and propagated plants published by the Virginia Native Plant Society. For a copy send a self-addressed stamped envelope to VNPS—Orders, P.O. Box 844, Annandale, VA 22003.

COMMERCIAL SEED SOURCES FOR SOUTHEASTERN NATIVE PLANTS

A one-page list of sources that offer propagated plants native to the southeastern U.S Published by the North Carolina Botanic Garden, UNC-CH, Totten Center 457A, Chapel Hill, NC 27514.

SOURCE LIST OF NATIVE PLANTS

A list of addresses of Western nurserie available from the Native Plant Societ of New Mexico, P.O. Box 5917, Santa Fe NM 87502. Send a self-addresse stamped envelope.

SOME SOURCES OF PLANT MATERIAL INDIGENOUS TO PINELANDS AREAS, 1981-1982.

Available for $1.50 from South Jerse Resource Conservation and Development Council, P.O. Box 67 Hammonton, NJ 08037.

SOME SOURCES OF PLANT MATERIAL NATIV OR ADAPTED TO SEASHORE CONDITION 1981-1982. Same as above.

TEXAS NATIVE PLANT DIRECTORIES

Contact the Texas Department of Agricu ture, P.O. Box 12847, Austin, TX 78711

ANDERSEN HORTICULTURAL LIBRARY SOURCE LIST OF PLANTS AND SEEDS, 198 214 pages.

A source list of over 40,000 entries of har plants (not exclusively native plan listed by scientific name. Wholesale a mail-order nurseries are include Available for $29.95 from: Anders Horticultural Library, Minnesota Lan scape Arboretu Drive, Box 39, Chanhassen, MN 5531

NATIVE PLANT SOCIETIES

National Organizations

NATIONAL WILDFLOWER RESEARCH CENTER
2600 FM 973 North
Austin, TX 78725

OPERATION WILDFLOWER
NATIONAL COUNCIL OF STATE GARDEN CLUBS
Mrs. C. Norman Collard, Chairman
Box 860
Pocasset, MA 02559

SOIL CONSERVATION SOCIETY OF AMERICA
7515 Northeast Ankeny Road
Ankeny, IA 50021

THE CANADIAN WILDFLOWER SOCIETY
35 Bauer Crescent
Unionville, Ontario L3R 4H3

THE CENTER FOR PLANT CONSERVATION
The Arnold Arboretum
Harvard University
The Arborway
amaica Plain, MA 02130

THE NATURE CONSERVANCY
1800 North Kent Street, Suite 800
Arlington, VA 22209

State Groups

ALABAMA
labama Wildflower Society
/o George Wood
oute 2, Box 115
orthport, AL 35476

LASKA
laska Native Plant Society
O. Box 141613
nchorage, AK 99514

RIZONA
rizona Native Plant Society
O. Box 41206 Sun Station
ucson, AZ 85717

ARKANSAS
Arkansas Native Plant Society
c/o Mr. Don Peach
Route 1, Box 282
Mena, AR 71953

CALIFORNIA
California Botanical Society
c/o Department of Botany
University of California
Berkeley, CA 94720

California Native Plant Society
909 12th Street, Suite 116
Sacramento, CA 95814

California Native Plant Society Chapters:
Bristlecone (Inyo-Mono Region)
Channel Islands
Dorothy King Young (Coast from Jenner to Ft. Bragg)
Kerr County
Marin
Milo Baker (Santa Rosa)
Monterey Bay
Mount Lassen
Napa Valley
North Coast
Northern San Joaquin Valley
Orange County
Riverside/San Bernadino Counties
Sacramento Valley
San Diego
San Francisco Bay
Sanhedrin (Ukiah)
San Luis Obispo County
Santa Clara Valley
Santa Cruz County
Santa Monica Mountains
Sequoia (Fresno)
Shasta
South Coast
Tahoe

National Alliance for Plants
c/o Alice Q. Howard
6415 Regent Street
Oakland, CA 94618
To improve rare plant protection.

Save-the-Redwoods League
114 Sansome Street, Room 605
San Francisco, CA 94104

COLORADO

Colorado Native Plant Society
Box 200
Fort Collins, CO 80522

CONNECTICUT

Connecticut Botanical Society
c/o Donald Swan
1 Livermore Trail
Killingworth, CT 06417

DISTRICT OF COLUMBIA

Botanical Society of Washington
Department of Biology — NHB/166
Smithsonian Institution
Washington, DC 20560

FLORIDA

Florida Native Plant Society
1203 Orange Avene
Winter Park, FL 32789

Florida Native Plant Society Chapters:
Big Pine Key
Central Florida
Coccoloba (N. Fort Myers)
Dade
Heartland (Hardee, Polk, Highland Counties)
Magnolia (Tallahassee)
Martin County
Naples
Palm Beach
South Brevard
Suncoast (Tampa Bay)

Pensacola Wildflower Society
c/o Jim Dyehouse
3911 Dunwoody Drive
Pensacola, FL 32503

GEORGIA

Georgia Botanical Society
c/o Dr. Frank McCamey, Treasurer
1676 Andover Court
Doraville, GA 30360

HAWAII

Hawaiian Botanical Society
c/o Department of Botany
University of Hawaii
3190 Maile Way
Honolulu, HI 96822

IDAHO

Idaho Native Plant Society
USDA — Forest Service
Intermountain Forest and Range Experiment Station
316 East Myrtle Street
Boise, ID 83706

ILLINOIS

Illinois Native Plant Society
Department of Botany
Southern Illinois University
Carbondale, IL 62901

INDIANA

Assoc. for the Use of Native Vegetation i
Landscape through Education
(A.N.V.I.L.)
871 Shawnee Avenue
Lafayette, IN 47905

KANSAS

Kansas Wildflower Society
Mulvane Art Center
Washburn University
17th & Jewell Street
Topeka, KS 66621

Grassland Heritage Foundation
5450 Buena Vista
Shawnee Mission, KS 66205
(To encourage the preservation of nati
prairie and the use of native vegetation
the landscape).

Save the Tallgrass Prairie, Inc.
4101 West 54th Terrace
Shawnee Mission, KS 66025
(To protect a portion of the tallgra
prairie within the National Parks.)

LOUISIANA

Louisiana Native Plant Society
c/o Richard Johnson

Route 1, Box 151
Saline, LA 71070

Louisiana Native Plant Society Chapters:
Acadian
Alexandria
Natchitoches
Ruston

Greater New Orleans Native Plant Society
Mr. David Heikamp
717 Guiffias Avenue
Metairie, LA 70001

Northwest Louisiana Native Plant Society
Mrs. Karlene Defatta
Route 2, Box 54-C
Keithville, LA 71047

MAINE

osselyn Botanical Society
/o Dr. Charles D. Richards, President
Deering Hall
University of Maine
Drono, ME 04469

MARYLAND

hesapeake Audubon Society
Rare Plant Committee
P.O. Box 3173
Baltimore, MD 21228

Maryland Native Plant Society
/o Scaffidi
4720 Claude Lane
ilver Spring, MD 20904

MASSACHUSETTS

New England Botanical Club
otanical Museums Avenue
Oxford Street
Cambridge, MA 02138

ew England Wild Flower Society, Inc.
arden in the Woods
emenway Road
ramingham, MA 01701

IICHIGAN

ichigan Botanical Club
atthaei Botanical Gardens
300 Dixboro Road
nn Arbor, MI 48105

IINNESOTA

Minnesota Native Plant Society
220 BioSci Center
University of Minnesota
1445 Gortner Avenue
St. Paul, MN 55108

MISSISSIPPI

Mississippi Native Plant Society
c/o Travis Salley, Secretary
202 N. Andrews Avenue
Cleveland, MS 38732

MISSOURI

Missouri Native Plant Society
Box 6612
Jefferson City, MO 65102-6612

NEVADA

Northern Nevada Native Plant Society
Box 8965
Reno, NV 89507

NEW JERSEY

New Jersey Native Plant Society
c/o Frelinghuysen Arboretum
Box 1295R
Morristown, NJ 07960

NEW MEXICO

Native Plant Society of New Mexico
P.O. Box 5917
Santa Fe, NM 87502

NEW YORK

Syracuse Botanical Club
Janet Holmes
306 Cleveland Boulevard
Fayetteville, NY 13066

Torrey Botanical Club
New York Botanical Garden
Bronx, NY 10458

NORTH CAROLINA

North Carolina Wildflower Preservation Society
c/o North Carolina Botanical Garden
UNC-CH Totten Center 457-A
Chapel Hill, NC 27514

Western Carolina Botanical Club
Richard M. Smith, President
Tinequa Drive
Connestee Falls

Brevard, NC 28712

OHIO
Cincinnati Wildflower Preservation Society
c/o Dr. Victor G. Soukup
Department of Biology
University of Cincinnati
Cincinnati, OH 45221

Ohio Native Plant Society
c/o Ann Malmquist, President
6 Louise Drive
Chagrin Falls, OH 44022

OREGON
Native Plant Society of Oregon
c/o Dr. Frank A. Lang
Department of Biology
Southern Oregon State College
Ashland, OR 97520

PENNSYLVANIA
Botanical Society of Pittsburgh
c/o Mr. Robert F. Bahl
401 Clearview Avenue
Pittsburgh, PA 15205

Muhlenberg Botanical Society
c/o North Museum
Franklin and Marshall College
Lancaster, PA 17604

Pennsylvania Native Plant Society
1806 Commonwealth Building
316 Fourth Avenue
Pittsburgh, PA 15222

Philadelphia Botanical Club
Academy of Natural Sciences
19th and the Parkway
Philadelphia, PA 19103

TENNESSEE
Tenneessee Native Plant Society
c/o Department of Botany
University of Tennessee
Knoxville, TN 37916

TEXAS
Big Thicket Association
Box 198
Saratoga, TX 77585
(To promote the preservation of the area of Southwest Texas known as the Big Thicket.)

Native Plant Society of Texas
P.O. Box 23836-TWU Station
Denton, TX 76204

UTAH
Utah Native Plant Society
c/o The State Arboretum of Utah
University of Utah, Building 436
Salt Lake City, UT 84112

VIRGINIA
Virginia Native Plant Society
P.O. Box 844
Annandale, VA 22003

Virginia Wildflower Preservation Societ
Chapters:
Blue Ridge, Roanoke
Jefferson, Charlottesville
John Clayton, Williamsburg
Piedmont, Warrenton
Pocahontas, Richmond
Potowmack, McLean
Prince William, Manassas
Shenandoah, Harrisonburg

WASHINGTON
Washington Native Plant Society
c/o Dr. Arthur R. Kruckeberg
Department of Botany
University of Washington
Seattle, WA 98195

Abundant Life Seed Foundation
Box 772, 1029 Lawrence
Gardiner, WA 98334
(To propagate and preserve native plan
of the North Pacific Coast with empha
on rare and endangered species.)

WEST VIRGINIA
West Virginia Native Plant Society
Herbarium, Brooks Hall
West Virginia University
Morgantown, WV 26506

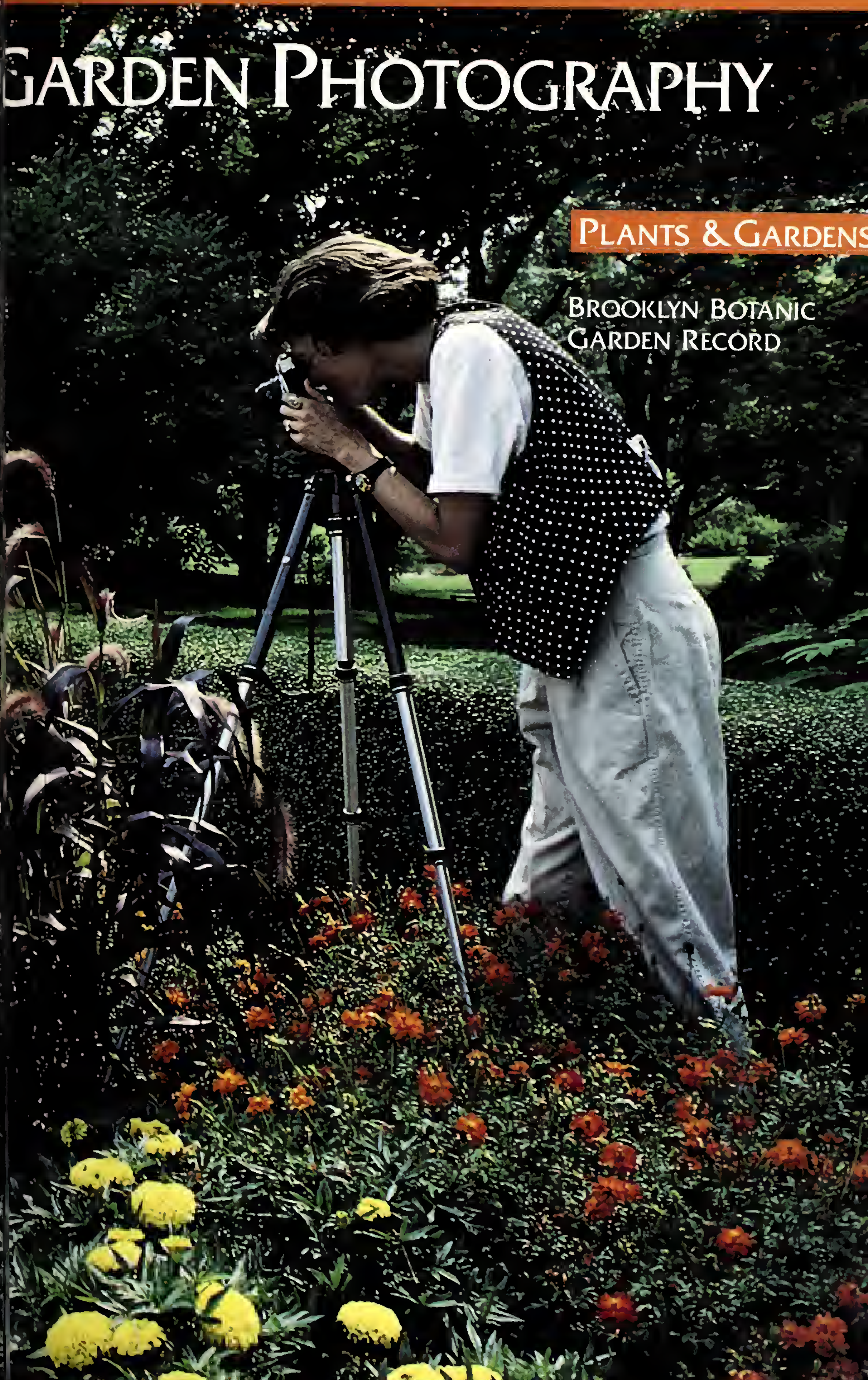
WYOMING
Wyoming Native Plant Society
P.O. Box 1471 (a)nt Society
P.O. Box 1471
Cheyenne, WY 82001

Practical handbooks to share the Brooklyn Botanic Garden's 76 years of excellence in horticulture, education and community service.

GARDEN PHOTOGRAPHY

PLANTS & GARDENS

BROOKLYN BOTANIC GARDEN RECORD



Plants & Gardens

Brooklyn Botanic Garden Record

Garden Photography

1989

Brooklyn Botanic Garden

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PLANTS & GARDENS
BROOKLYN BOTANIC GARDEN RECORD

Garden Photography

Vol. 45 Handbook #120 Summer 1989 No. 2

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Betsy Kissam photographing at BBG *Cover photograph by Elvin McDonald*

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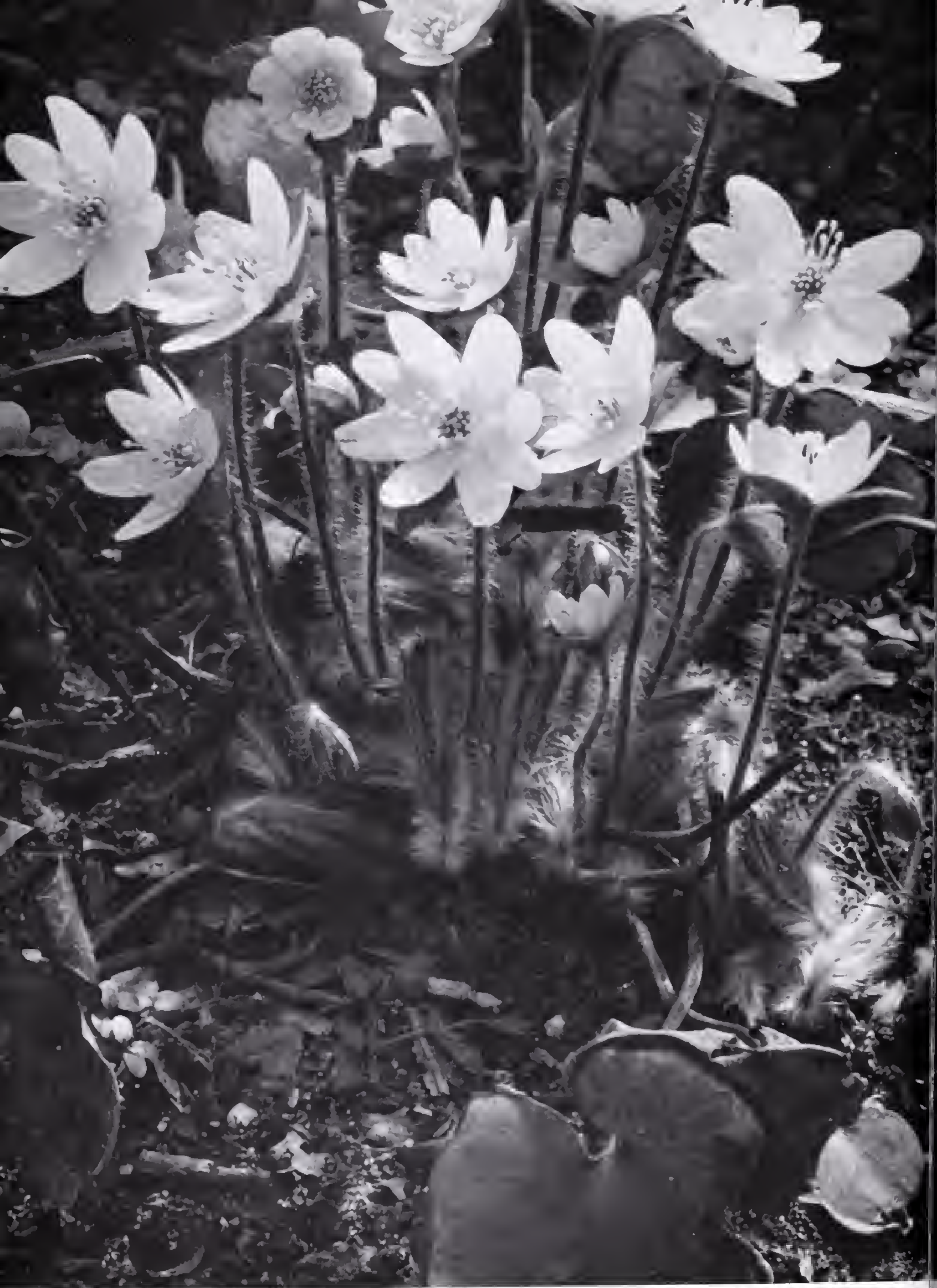


Photo by Gottscho-Schleisner

Hepatica acutiloba *is photographed with back lighting to show the extraordinary fuzzy stem and newly emerging leaves. This ethereal flou of spring presents a dramatic subject for the garden photographer.*

foreword

Each gardener knows his or her own garden and the plants therein better than anyone else. Not only do gardeners know their plants and gardens, but they know the effects of light shifts at different times of the day, as each season changes—after a rain, a heavy dew, a new snowfall.

These intimate facts equip such gardeners to capture their own creations on film. This record can be used to document successes and failures for the future. Those plants that successfully worked in the scheme of things can be repeated—those that did not can be avoided.

This visual history along with a gardener's notes can be invaluable as a reference. Not only will the record be useful, but capturing plants at their best is an art in itself and the results will be as rewarding to some as the act of gardening itself.

Gertrude Jekyll, especially in her later years when her eyesight was failing, used photography to create a visual record and to communicate her ideas of garden design to others. Her visual and verbal record survives to guide us as your record can guide and inspire you.

We wish you good gardening and good photographing.

Barbara B. Pesch,
Guest Editor

Photographer/horticulturist Charles Marden Fitch travels the world documenting plants in their native habitats. His assignments include documentary science projects in Latin America with the U.S. Department of State, the Organization of American States and the Peace Corps. Fitch is author of numerous books including the ***Rodale Book of Garden Photography*** *and* ***All About Orchids.*** *More than 2,000 of his plant portraits taken in Africa, Asia, South Pacific and Latin America appear in 'Exotic Plants,' a video laser disc compendium. Charles Marden Fitch was guest editor for* P&G *handbooks:* ***Indoor Gardening*** *and* ***Orchids.***

Notes from the Guest Editor

The articles in this handbook reflect the individuality of each contributing photographer/author. Each has his favorite cameras, films and approaches to plant photography. But a sensitivity to nature and a desire to capture beauty on film is the common characteristic of these garden photographers.

Photographic equipment varies around the world. The most suitable tripod for my work may not match your needs. Your favorite film might not suit someone else's goals. Some specific brand names are mentioned in this handbook for your convenience. However, mention of a film brand or camera model does not imply that other brands may not be equally suitable.

An excellent way to study appropriate equipment and film is to visit a professional photographic store. Ask questions and be specific about your photographic goals. Local camera clubs are another helpful source because members enjoy talking about their favorite approaches to photography.

Many botanical gardens and universities offer short courses on photography. Some offer specific classes in plant photography. Courses offer an excellent opportunity to learn from experienced photographers.

Finally, supplement this handbook with additional reading in the area of your special interest. Check the library and bookstore for photography titles in close-up work, landscape photography, studio techniques, travel and nature photography.

Study the instruction booklets for each piece of equipment you use. Keep the instructions for future reference. Capturing landscapes, habitats, and plant portraits on film is an exciting blend of science with art. Being a gardener is the best start toward becoming an excellent horticultural photographer.

Charles Marden Fitch,
Guest Editor

Garden Photography: Taking Time to Compose Fine Photos

Robert S. Harris

Gardeners know there are only a few precious days when most flowers are in perfect bloom at peak color. And, when tomatoes are luscious red and ripe for picking, you're tempted to freeze that moment to capture your proudest produce.

Whether your goal is to display prize-winning flowers or glistening fruits and vegetables from your garden, time often is the deciding factor. Garden displays, whethe public or private, only last as long as weathe permits, but the tools to capture their pea brilliance are within reach, in the form of camera loaded with film.

Garden photography is rewarding, and th enterprising picture-taker can make the mos of a colorful flower bed, a crisp, bright day, an today's easy-to-use films and cameras. A majo advantage for garden picture-takers is th familiar landscape. No one knows your ros bushes as well as you do, and a familiarity wit

---

Robert Harris, teacher, lecturer and world travel is a photographer for Eastman Kodak Company multimedia travel productions. He holds a Mast of Photography degree and has won many awar for his photographs. Bob assisted in photograph training of NASA astronauts and has contribut articles to magazines such as Popular Photograph *and* Petersen's Photographic. *His photo featur also appear in several Kodak books.*

Choosing the correct angle when photographing home gardens and landscapes is important. Th courtyard garden in China shows specimen tree in relationship to the ornate facade of the hous

your subjects—whether plants or people—often adds a relaxed, comfortable aspect to your picture-taking. What's more, the veteran gardener often can apply his or her expertise when photographing a public garden.

Unlike action photographs, garden photography gives you fewer variables. Except for an occasional breeze, plants rarely move, so stopping action or hurried refocusing are seldom problems. Time is on your side; lilacs do not attack curious camera carriers.

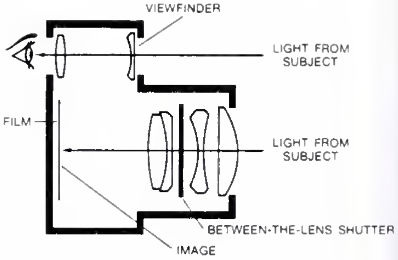
Whether a garden is large or small, most picture-takers can orchestrate their scenes to capture exceptional floral images on film. When you take a camera in hand, you choose the time of day when lighting conditions are most suited to your photographic needs. A quick check of the local weather report can help you plan a productive day behind the camera.

One of the best ways to get good garden photos is to become familiar with the tools at hand, in this case, your camera and film. Just as pianists rely on fine instruments as well as their natural skills, you need to develop a rapport with your picture-taking tools. Once you feel confident using a camera, your sense of creativity can emerge.

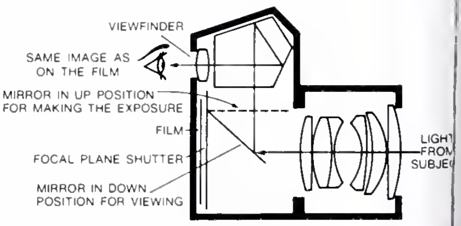
Selecting Cameras and Films

For any picture-taking endeavor, a basic guideline is to "keep it simple." This is especially applicable for garden photographers, whether you use a sophisticated single lens reflex (SLR) camera or a compact, automatic camera. Vibrant colors and interesting shapes abound in your garden, so it's often easy to capture the images you want. Such photos, however, require attention to composition, lighting and background. The right camera can make these details easier to control.

Many picture-takers today prefer cameras that use 35mm film for either slides or prints. Whether you prefer the detailed control of SLR cameras—with interchangeable lenses and variable shutter speeds—or the decision-free features of automatic cameras, look for an easy-to-use, reliable model that feels comfortable in your hands.



Camera with Direct Optical Viewfinder—This type of viewfinder is used in rangefinder cameras


VIEWFINDER
SAME IMAGE AS ON THE FILM
MIRROR IN UP POSITION FOR MAKING THE EXPOSURE
FILM
FOCAL PLANE SHUTTER
MIRROR IN DOWN POSITION FOR VIEWING
LIGH
FRO
SUBJE

Camera with Single-Lens-Reflex Viewfinder—A movable mirror directs the image formed by the camera lens up through a pentaprism in the viewfinder to your ey When you take the picture, the m ror moves up out of the image pa so the image strikes the film. Afte the exposure is made, the mirror moves back into position in front the film for viewing

In compact cameras, many of the exposure film speed and even focusing procedures ar automatic. For example, the Kodak S100E camera is designed for ease-of-use, with fixed-focus, three-element glass lens, auto matic exposure, and a built-in electronic flash. For greater options, the Kodak S900 Tele camera offers two built-in lenses—a 34mm wide-angle lens for full views and a 62mm telephoto lens for close-ups. The lenses change at the touch of a button; when used in telephoto mode, the camera automatically focuses on the subject of the photo.

Black-and-white films are preferred in photojournalism, but the beauty of plants and flowers is best captured on color film. How you plan to display your photographs helps determine whether you use color print or color slide films. For color photographs to place in frames or albums, a color negative film is preferred. If you plan to produce photos for publication or projection, color slide film is best.

Film speed is an important element of photography, but an easy aspect to understand. All films have ISO numbers; the higher the number, the greater a film's sensitivity to light. A film with an ISO number of 100, for example, works well in bright daylight scenes, while an ISO 400 film is preferred when less light is available.

Because of the garden photographer's attention to detail—the delicate patterns of a rose, for example—slow- or moderate-speed films often work well for color prints. Kodacolor Gold 100 or Kodacolor Gold 200 films offer fine grain for detailed images, as well as rich colors important to hobbyists and professional photographers. You will also find these films produce images which can be easily enlarged. In addition to a snapshot of your most glorious gladiolus, you can use the same 35mm negative to order a handsome 8 x 10-inch print, suitable for framing.

Once you've selected a camera and film, try them out on everyday scenes to become familiar with the operation of the camera. Experiment first with simple snapshots of family or friends to get accustomed to the feel of the camera. If you're used to older, metal-bodied cameras today's lightweight models may surprise you. After taking a few photos, you'll also have a better idea about how to plan the images you want to take.

Every photographer's goal is to capture both the drama and the subtleties of colors in a balanced, attractive picture, presenting the images in a harmonious composition. That's not nearly as difficult as it might sound.

Creating a Scene with Light and Color

Composition, lighting and background are often the factors that make the difference between good photographs and exceptional ones. By becoming familiar with each of these concepts and putting them to work for you, you can capture garden scenes that really showcase your horticultural expertise.

Composition simply means balancing the subject of each scene with attractive but uncluttered surroundings. A vivid close-up of an orchid, for example, can be weakened by a busy background of garden tools or other out-of-place items. Focus on one subject at a time, and spend a few moments looking over the image in your viewfinder. If you see background clutter, it will appear in your photos unless you change position to remove it. Sometimes, a step to the left or right is all that's needed to eliminate a distracting background.

Most important, however, is moving in close to the plant or flower you wish to photograph. If you use an SLR camera, a standard 50mm lens enables you to move within a foot or two of the subject. Today's non-SLR compact cameras let you get within four or five feet of a subject. Many backyard photographers capture striking images of insects and small animals by getting as close as possible. Close-ups also allow you to emphasize the vibrant and contrasting colors of a garden that may not seem as dramatic from a distance. Don't let your camera distance you from your flowers.

In fact, to assure that you make the most of your photo opportunities, you may want a view of your plants and flowers as they appear through a close-up lens. Close-up lenses, which adapt easily to most SLR cameras, are relatively inexpensive and simple to use.

Close-up lenses fit over the camera lens in the same manner that a filter is placed onto your camera and will allow you to get as close

Pine branches above and shadows below frame this Vietnamese pagoda. (Thien Mu Pagoda Garden, Hue, Vietnam.)

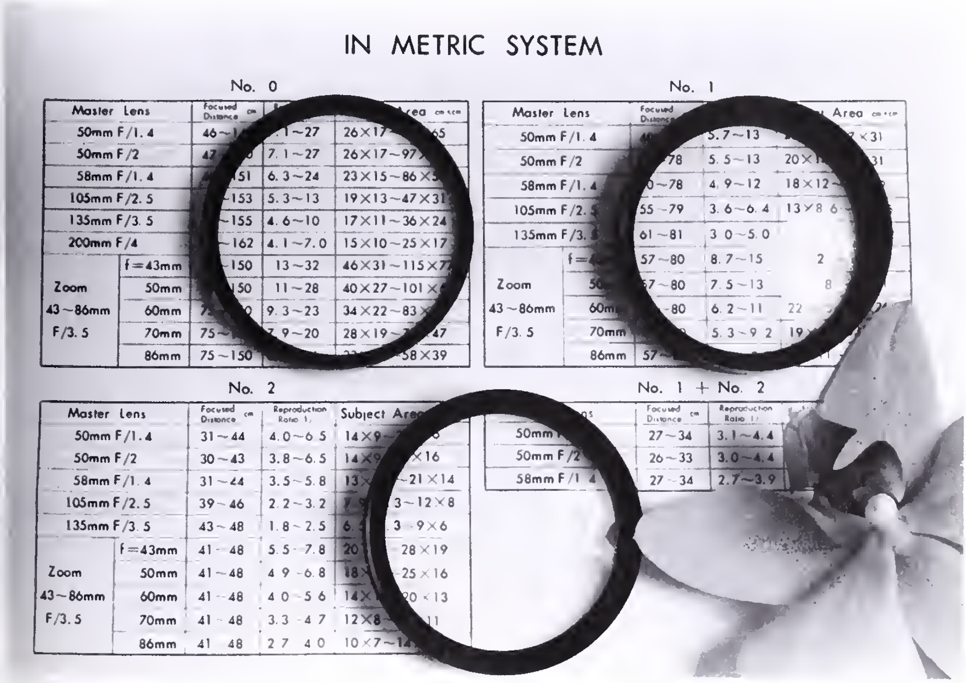
as one and a half to two feet from the subject. For most conditions, you will not have to adjust exposure, which makes using close-up lenses an easy way of expanding your photographic experience and adding fascinating images to your garden collection.

Another advantage to using close-up lenses with your SLR is that focusing and framing is the same as with normal distances. However, if you are using a rangefinder camera you will have to take extreme care when measuring the subject distance. You will also have to correct the framing for parallax. (Parallax, which occurs in rangefinder and twin lens reflex (TLR) cameras, is the difference between the image which appears in the viewfinder and the image that is actually exposed. It can be corrected very simply by tilting the camera in the direction of the viewfinder. Some rangefinders and TLRs come with a visual close-up frame within the viewfinder, while others do not correct this photographic error. Photographers must be keenly aware of this visual discrepancy when capturing close-up images). That is why a single lens reflex design is best for close-ups of small subjects.

Another variable that will come into play when using a close-up lens is the very shallow range of focus—depth of field—that will be available. If you want to increase the depth of field use the smallest lens opening that lighting conditions will allow.

Many other factors also affect close-up photography. For instance, when you are extremely close to your subject, beware of even the slightest breeze which can sway a flower enough to cause a blurred image. And, in general, photographers must be careful not to shake the camera. Therefore, get as close to the subject as necessary. Be certain you have a steady stance. Many photographers find a tripod useful in preventing unwanted camera shake.

Screw-in lenses attach like filters to permit close focusing. Detailed charts may be provided by the manufacturer to show the area covered with various combinations of camera lenses and close-up attachments.



IN METRIC SYSTEM

No. 0

Master Lens		Focused Distance cm	[illegible]	Area cm×cm
50mm F/1.4		46~1	.1~27	26×17 65
50mm F/2		47	7.1~27	26×17~97
58mm F/1.4		151	6.3~24	23×15~86×
105mm F/2.5		~153	5.3~13	19×13~47×31
135mm F/3.5		~155	4.6~10	17×11~36×24
200mm F/4		~162	4.1~7.0	15×10~25×17
Zoom 43~86mm F/3.5	f=43mm	~150	13~32	46×31~115×7
	50mm	150	11~28	40×27~101×
	60mm	[illegible]	9.3~23	34×22~83×
	70mm	75~	9~20	28×19~ 47
	86mm	75~150	[illegible]	58×39

No. 1

Master Lens		Focused Distance	[illegible]	Area cm×cm
50mm F/1.4		[illegible]	5.7~13	×31
50mm F/2		78	5.5~13	20× 31
58mm F/1.4		0~78	4.9~12	18×12~
105mm F/2.5		55~79	3.6~6.4	13×8 6
135mm F/3.5		61~81	3.0~5.0	
Zoom 43~86mm F/3.5	f=	57~80	8.7~15	2
	50	57~80	7.5~13	8
	60m	~80	6.2~11	22
	70mm	[illegible]	5.3~9.2	19
	86mm	57~	[illegible]	

No. 2

Master Lens		Focused Distance cm	Reproduction Ratio 1/	Subject Are
50mm F/1.4		31~44	4.0~6.5	14×9~
50mm F/2		30~43	3.8~6.5	14×9 ×16
58mm F/1.4		31~44	3.5~5.8	13× ~21×14
105mm F/2.5		39~46	2.2~3.2	3~12×8
135mm F/3.5		43~48	1.8~2.5	6. 3~9×6
Zoom 43~86mm F/3.5	f=43mm	41~48	5.5~7.8	20 28×19
	50mm	41~48	4.9~6.8	18× 25×16
	60mm	41~48	4.0~5.6	14× 20×13
	70mm	41~48	3.3~4.7	12×8~ 11
	86mm	41~48	2.7~4.0	10×7~14

No. 1 + No. 2

s	Focused Distance cm	Reproduction Ratio 1/
50mm	27~34	3.1~4.4
50mm F/2	26~33	3.0~4.4
58mm F/1.4	27~34	2.7~3.9

If you want to show the detail of a tulip's pistil and stamen, aim straight down on the flower to see past its petals. If you're undecided as to the best angle to use, try several positions and then select the best one from the finished prints.

A wood and bamboo lattice house provides an interesting background for this papaya tree photographed in Sumatra. The shadows add interesting details.

The angle and amount of light in your garden photos is a matter of taste and experimentation. When photographing plants and flowers, their natural colors, textures and shapes lend themselves to filling a frame with captivating images. You can capture these challenging images best if you take your photos when there's plenty of daylight to fully illuminate your flowers.

If you visit a greenhouse or conservatory, you'll have additional challenges to consider. Lighting is usually softer inside these structures, so a "fast" color film, with a higher ISO rating, can be a useful alternative to an electronic flash. Kodacolor Gold 400 is highly effective in subdued lighting situations.

You need not restrict your garden photography efforts to sunny days. Early or late in the day, the sun is low in the sky and provides interesting highlights and shadows which allow for more artistic scenes. For example, sidelighting or backlighting can emphasize shapes and patterns that frontlighting can obscure. Sidelighting is particularly effective in emphasizing the textures of flowers and plants, while backlighting will draw attention to their translucent quality. Again, experiment with placing yourself at different angles to vary the angle of light on your subject.

With the sun at your back, avoid having your shadow or those of nearby structures become part of your photo. Again, a step to the left or right may prevent shadows from inadvertently darkening your pictures.

Because many cameras are now equipped with a built-in flash, you have the convenience of adding more light to accentuate garden images. When shade has partly hidden a flower, a flash can bring out details that would otherwise be missing.

Using People, Places and Things

Photographic interpretations of your garden occasionally may require some ingenuity on your part. Simple household items can be used to help create a different mood in your pictures. For example, if you want a photograph to capture the image of a leaf or petal sprinkled with dew, spray a few drops of water on them using an ordinary pump spray bottle.

The inclusion of the hand in this photograph provides proportion for the miniature rose 'Littlest Angel.'

To help brighten a scene with a small plant, use a small piece of white paper or a white envelope as a reflector. Simply position it close to the flower or plant you wish to photograph (but outside of the picture), and it will reflect daylight or the burst from your flash.

In creating a photographic image, remember that you can control much of the setting and surroundings. An easy way to stage an interesting scene is with people. Children and flowers are always a winning combination; a photo that shows a freckled-faced child giggling as a dandelion tickles her nose is simple but precious. Keep in mind that your garden is for human enjoyment; use your camera to capture those moments when people are appreciating it.

Here are some aids to assist in keeping your camera clean: a rubber air blower, lens cleaning tissue, lens cleaning fluid and a small screwdriver set (to tighten loose screws).

Camera Care

Planning is important to good photography, but so is keeping your camera and film ready for picture-taking. Kodak experts suggest you get in the habit of treating your camera with tender loving care.

Start with camera cleanliness; it's a critical part of photography. For example, if the lens of your camera becomes dirty, clean it with a drop of a lens-cleaning solution on a folded camera lens tissue. Never use eyeglass tissue or cleanser since they may remove the delicate lens coating. Also, keep your fingers away from the lens surface. Use photographic lens paper rather than ordinary tissue, handkerchiefs, shirttails or other potentially abrasive cloths.

Camera interiors can be susceptible to dust, which can also blemish prints. Photographers use many methods to remove dust, but periodically cleaning the camera's innards with a soft lens brush is usually enough.

Remember, too, that only a few cameras are water-resistant. If you plan to use your camera on rainy days, use a transparent plastic bag large enough to hold the camera; position it so the open end of the bag does not block the lens. You can work the shutter and other controls from outside the bag.

For a day at a botanical garden or flower show, pack an "emergency kit" that can prolong your picture-taking pleasure. Include spare batteries for both the camera and its flash; an extra roll or two of film; lens tissue and a camel's hair brush to clean the camera, if needed; a waterproof bag for unexpected showers, and a notepad and pencil to jot down

Reflectasol opened to a flat position forms a useful reflector for photographing Colchicum 'Waterlily'. *The white side of a Kodak gray card is an additional shadow filler.*

The arbor and shadows frame the distant white fountain and the rose garden at Huntington Botanical Garden in California.

names and locations of various plants and flowers.

When you finish a day of picture-taking, give your camera a rest, too. Release the shutter to relax the mechanism. Remove the batteries when storing your camera for an extended period. When reinstalling them,

check the contacts in the battery compartment; if they're dirty, use a pencil eraser to remove any corrosion.

Remember that extreme heat or cold may affect a camera's operation, so avoid placing it in a car's glove compartment or trunk for long periods. In warm weather, a car becomes a greenhouse, and high temperatures can affect any camera. Store yours safely.

Common sense camera care has its place, but most of today's cameras need expert attention when problems develop. In these cases, ask a qualified service shop to examine your camera. Professionals can check a camera's working parts and its lens and test it for light leaks.

The best advice in camera care is not to shelve your camera for very long. A camera that isn't taking any pictures collects dust, not memorable photos.

Film Care

Proper film-handling begins as soon as you purchase a roll of film. Again, do not store film in a car's glove compartment on a hot, sunny day. Instead, keep it in a cool, dry place, away from sunlight or other heat sources. Use the film before the expiration date printed on the box. Once you open the package, try to use the film in the next couple of days.

Many cameras automatically load film by advancing a roll to its first frame when you close the film door. With others, you thread the film on a take-up spool by hand. In either case, find a shady or darkened area for loading to avoid accidental fogging.

Look for interesting details that may be revealing. Here a venerated cedar grows through a Qing Dynasty Confucian temple in Xian, China.

Use the film box top to remind you of the type of film and number of exposures on the roll. Tuck it in a pocket or under the buckle of your camera's neck strap as a reminder. On some cameras, this data appears on the film cassette and is visible through a window on the camera body. Other cameras have a rear slot designed to hold a film box top; remember to change it each time you switch to a different speed or type of film.

Whether your picture-taking leads you to a public garden or your own backyard, carry extra film. When you have an idea for a photo, it is frustrating to run out of film. Here's where the extra film in your "emergency kit" comes in handy.

Finishing Touches

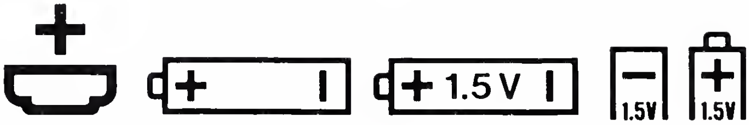
Success in garden photography is measured by more than a set of finished prints. The images of flowers or plants you collect with a camera are unique; they are interpreted on film with a one-of-a-kind vision of your garden. In floral photography, your only limitation is your imagination. Be creative, and use your knowledge of flora as a stepping stone to experimentation.

The most effective way to expand your horizons is by practicing picture-taking whenever time and circumstances allow. A camera loaded with a fresh roll of film offers endless photo opportunities, waiting to be explored. By photographing flowers and plants at various times of the day and during various stages of growth, you can enjoy chronicling the development of your skills as both a gardener and a photographer. You will find your confidence in picture-taking growing as rapidly as your healthiest plant or flower.

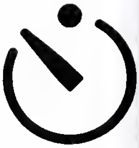
(Note: Kodak and Kodacolor Gold are trademarks.)

Graphic Symbols for Camera Operation and Function Display

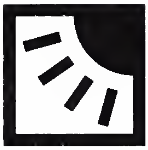
Battery



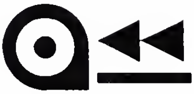
Self-timer



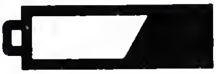
Counter light control



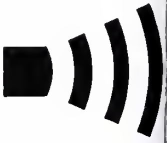
Film reversing



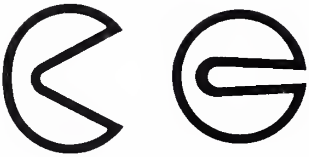
Battery check



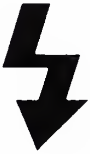
Sound and Voice



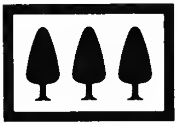
Opening & Closing



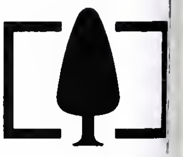
Flash



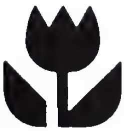
Wide-angle



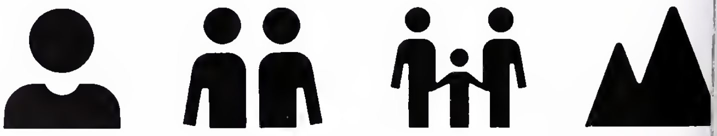
Telephoto



Close-up



Zone focus



Understanding Equipment: Test Fully!

Charles Marden Fitch

For more than 25 years I have used a succession of Nikon single lens reflex cameras. Each new model has had slight improvements over older designs but the basic mechanical operations remained similar. It was not really necessary to re-learn how to operate each new model.

This changed when computer-controlled automatic features were introduced. All major camera manufacturers now use sophisticated programming devices in their advanced designs. My newest Nikon has a 100+ page instruction book. Such texts are required reading if you want to fully exploit and control all the useful features.

Test Fully

When you begin using new equipment, expose a few test rolls of the same type of film you plan to use later. Keep notes as you go. Test all features of your camera, flash, and accessories, referring to the instruction books for recommended manipulations. Keep your test slides or prints in a notebook for future reference.

Automation

Modern automatic controls can provide perfect exposure of average subjects and a specific film but they can only provide optimum artistic quality if you (the photographer) direct controls for depth of field and motion-stopping shutter speeds.

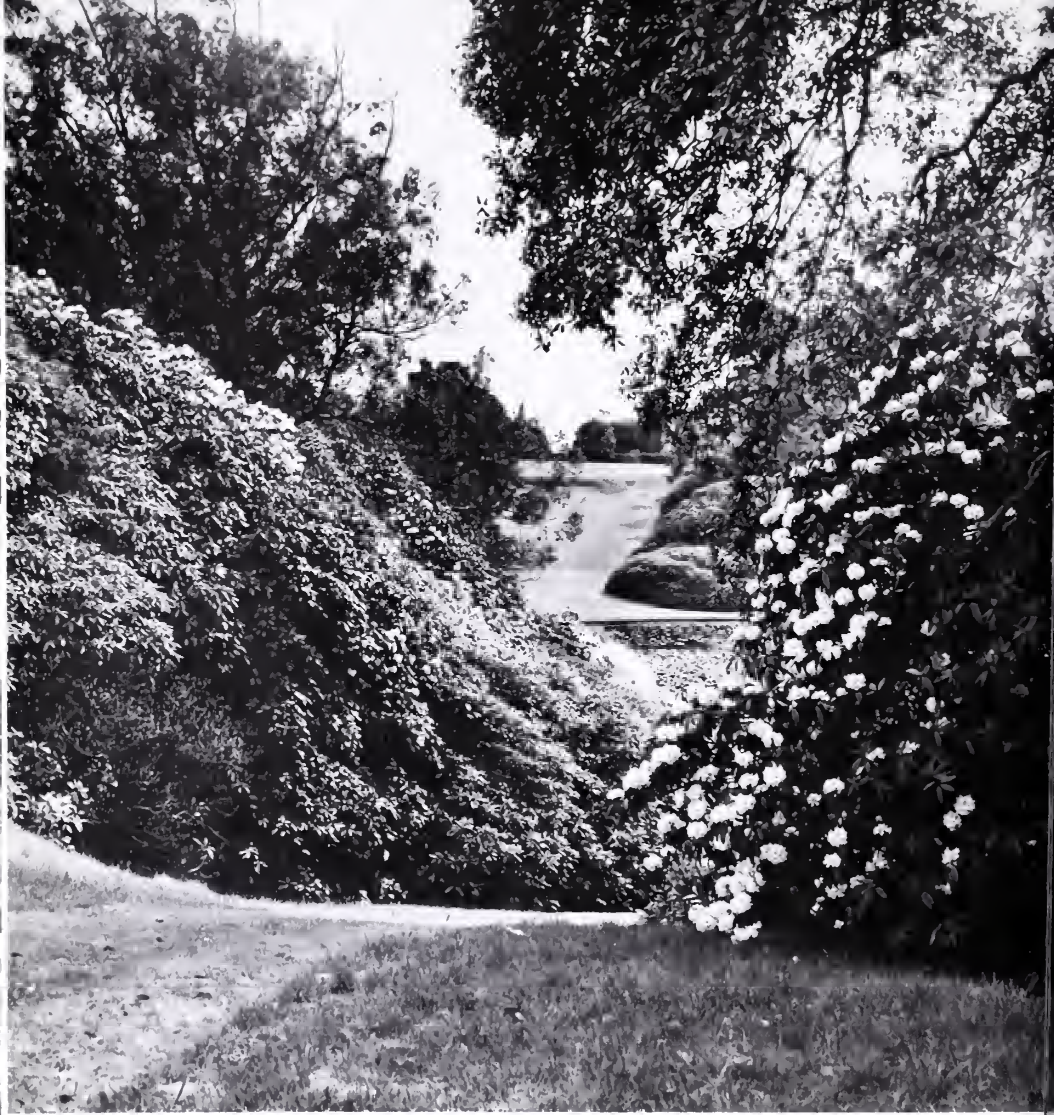
The most sophisticated computer-controlled camera still depends upon you to decide if a flower's swaying in the wind should be stopped to freeze the view (fast shutter speed) or if the movement in the wind should be visualized to record a blur of color (slow shutter speed). With many cameras and flash you can actually get BOTH effects on one frame, if you know how to use combinations of slow shutter speeds with electronic flash.

Similarly you must decide how deep the zone of focus (depth of field) should be. For example consider photographing a garden bed. Do you want only the front row of flowers really sharp? . . . or do you prefer that the whole border plus everything behind and in front be sharp? You must program/control/manipulate the camera to use a small iris opening for maximum depth of field, or to expose with a wide open iris for minimum depth of field.

Symbolic Help

Modern cameras from Japan are labeled with symbols to help you understand multiple features. Here are the most popular symbols, created by the Japan Machinery Design Center and used by the major manufacturers.

(See opposite page.)



All photos by Arthur Hellyer

Rhododendrons and azaleas around the circula pool in the Castle Kennedy garden, Loch Inch, near Stranraer, Scotland.

A springtime view to the mainland from the garden of Achamore House on the tiny island o Gigha off the west coast of Scotland.

Arthur Hellyer is gardening correspondent for t Financial Times, *London. He was editor of* Amate Gardening *from 1946-67and is a contributor* Country Life *and* Homes and Gardens. *He is al author of* The Amateur Gardener *and* The Sh Guide to Gardens.

PHOTOGRAPHING GARDENS

Arthur Hellyer

I use a camera for two purposes: to provide pictures for reproduction and as a permanent record of gardens I have visited and plants I have admired. If I have to write about these gardens or plants, the pictures are a valuable supplement to the notes I have made about them — frequently revealing features that I had forgotten or not even fully appreciated at the time. Because of this dual purpose, I usually take a lot of pictures. Some

of them are carefully composed to look beautiful when reproduced but many are taken with the sole objective of recording the character of the plants or the design of the garden.

Because I need an accurate record, I photograph everything in color and because I usually require a lot of pictures in quite a short time, I use a 35mm camera with through-the-lens light metering. Also for economy of time I seldom use a tripod. This does sometimes result in some loss of quality but by using moderately fast film and cutting exposures whenever possible to something less than 1/100 sec I do reduce the effect of hand shaking to a minimum. When faced with bad light that makes such short exposures impossible, I look for some convenient prop to steady my body and arms. Sometimes it can be found against a wall or tree, sometimes by kneeling,

A picturesque stone bridge spans the man-made river in the 18th century landscape garden at Stowe, Buckingham, England.

The Moon Ponds and Temple of Piety in the early 18th century landscape garden at Studley Royal, North Yorkshire, England. The formal garden contrasts with the natural setting.

squatting or even lying on the ground. By such simple means I have even succeeded in taking tolerably good pictures at exposures of 1/8 sec although when conditions are that bad it is better to use a tripod.

It is much easier to photograph gardens or plants in color than in black and white since color involves no mental transposition from what one actually sees. This problem is far more acute with plants than it is with buildngs. Reduced to monochrome the colors of lowers and of leaves behave in the most unpredictable ways. I have noticed that even he greatest experts can go hopelessly astray.

Color does give some problems but they are not as numerous as those of monochrome photography. Variables include the film, the quality of the light and the color of the plant which film rarely records in quite the same way as the human eye. Most strong reds suffer in bright sunlight and are best photographed outdoors when the sky is a little overcast. Blues can be most unpredictable and it seems almost impossible to capture some blues on film no matter what one does. A notable example is *Stokesia cyanea*, a hardy plant with blue, cornflowerlike flowers which almost invariably become lilac-pink in a photograph. No doubt this could be rectified by the use of filters.

When photographing gardens it is necessary to use fairly wide-angle lenses whereas for individual plants, and even more for close-ups of flowers, a moderately long focus lens is preferable. For years I made use of several lenses in the belief that the available zoom lenses gave insufficiently sharp images throughout their focal length. Maybe this was always an unjustified prejudice or perhaps the lens makers have improved their formula. The fact is that, since I purchased a zoom lens with a range from 35 to 70mm, the miscellaneous fixed focal length lenses have lain almost unused in my bag. Only occasionally do I reach for the 28mm lens to deal with a particularly confined space or a telephoto lens to capture something I cannot approach closely

Composition is an individual matter. I like to keep foregrounds reasonably full and sometimes this is the biggest problem since garden makers never design their gardens for the benefit of photographers. The human eye make

compensations and relates one thing to another in a way that is quite impossible for the inanimate camera. Yet by wandering around and looking for conveniently placed beds, shrubs, trees, ornaments and buildings, a satisfactory solution can usually be found.

This is the lovely walled garden made by Sir David Lindsay in 1604 for Edzell Castle his home in Tayside, Scotland. Flowers grow from the niches in the wall.

An elaborate stone fountain was reconstructed from ancient fragments in the 17th century garden of Pitmedden House, Grampian, Scotland.

The greatest difficulty to outdoor photography is the weather. Full-time photographers may be able to wait for days or to return to their chosen site when the weather and light prospects are most favorable. My work, primarily as a writer and only secondarily as a photographer, almost completely precludes such latitude. I must visit a garden on an appointed day and get on with the task of recording it with pen and camera even if it rains all day. Even a cloudless sky can present problems since it can be almost as uninspiring as one that is totally covered with cloud. The ideal is the mixture of blue and white that can be produced by anything from almost static cumulus to scurrying cirrus. Yet these can also be the most time-consuming days as one stands impatiently waiting for the shafts of sunlight to illuminate the important features of the composition and the background sky to hold a reasonable mixture of blue and white. One can learn a lot about cloud formation on days like that and results can be rewarding.

The difficulty with public gardens is the visitors. Of course it depends on what one is looking for. Sometimes the animated scene is just right. The vast terraces of Versailles were conceived as stages on which the king and his

The giant leaves of Gunnera manicata *unfolding in the bog garden at Achamore House, Isle of Gigha, Scotland.*

courtiers could parade. If one cannot have them, at least a medley of gaily clad tourists may provide a tolerable substitute. But there are also gardens created for solitude. At Studley Royal and Stourhead, for example, any intrusion on the peace of Arcadia is intolerable. Patience is the only solution, allied with a promptness in taking the picture the moment one group of intruders disappears and the next arrives. Occasionally people are sympathetic to photographers and will wait a moment when they see the camera raised. More often they are totally oblivious, taking up a position in the foreground and continuing to chatter for what seems an eternity. No wonder a professional garden photographer once told me that he found his work very hard on the nerves.

Rose beds are backed by massive yew hedges on the terraces of Crathes Castle near Aberdeen, Scotland. The castle was built in the 16th century but most of the garden was made in the 20th century.

COPING WITH CHALLENGING LOCATIONS

Charles Marden Fitch

Location is the word professional photographers use to identify work away from the controls and comforts of a *studio.* A den, greenhouse or patio may be the studio; a distant garden or exotic jungle the challenging location.

Creating photographs in unfamiliar or trying locations requires effort. Turning out artistically satisfying or scientifically useful photos under less-than-ideal conditions is an even greater challenge. What are some techniques that will help you with photography on location? The most important technique is planning.

Goals

Have a clear goal for each photography event. Know how you want to use your photographs. Some common categories of use include:

1. Slides for teaching or publication

A fast film (ISO 400) helps author/photographer Fitch to capture a low-angle view of Amorphophallus *foliage in a shady Malaysian jungle.*

Charles Marden Fitch is photographing cactus in Colorado desert habitats. Here he uses a reflector 'bottom center) to fill in harsh shadows, a tri-pod to steady the camera and improve composi-tion. The white hat protects the photographer against sun stroke.

2. Prints for a scrapbook
3. Slides or prints for scientific records
4. Artistically satisfying photographs for display prints

Knowing how your photographs will be ised is one step toward selecting appropriate:
1. Film
2. Camera
3. Lenses
4. Light Controls
5. Accessories

onditions

Inder what conditions must you take the photographs? A mismatch of film to conditions, or amera/lens to available light can be a disaster.)nce while on a trip in Uganda I took a boat ide down the Victoria Nile. I was busy phoographing habitat vegetation and sunbathing rocodiles until a fellow traveler interrupted ne with questions.

"How can you get any good shots from this moving boat when it's cloudy?" he asked. He was finding it impossible to get a suitable exposure reading with his excellent camera and lens so I asked "What film are you using?". "Oh, the camera store owner told me Kodachrome-25 was the best slide film so that's what's in my camera."

Without knowledge of his customer's location conditions the camera store owner had identified Kodachrome-25 as the "best color slide film." Kodachrome-25 is widely accepted by professionals as an excellent fine-grain film with saturated true colors but it's not the *best* choice for photographing from a moving boat, on a cloudy day, with a handheld f/4.5 telephoto lens.

Preplan

With better planning that disappointed photographer would have had success on his Nile adventure. For example he should have known that:

1. A f/4.5 lens lets in only a moderate quantity of light.

2. Africa has cloudy weather in the rainy season.
3. Photographing with long telephoto lenses from moving boats requires fast shutter speeds for sharp results.
4. Small flash units are usually ineffective for distant subjects.

With these facts in his preplanning file, he would have asked his camera store friend for a slide film suitable under conditions noted above [for example an ISO 200 to 400 film]. Asking only for "the best slide film" got him into trouble. Here are some suggestions and techniques for successful plant photography on location, especially during travel.

Basics

To understand why your plans should include such specific choices, remember the basics. Correct exposure for any light-sensitive film is delivered by the interaction of two mechanical camera parts;

1. The size of the lens opening, called f/stop, iris, or aperture.

2. The speed of the shutter, i.e. how long the light (the image) falls on the film.

Even automatic cameras depend on these wo mechanical aspects (aperture and shuter) to deliver correct film exposure.

Sharpness

1. To get sharp results the subject must be still in relation to the film. An image moving across the film will register with varying degrees of blur. Moving subjects require faster shutter speeds to record clearly than do stationary objects.

Careful attention to composition places the Wong Tai Sin Temple adjacent to the Sik Yuen Garden located in Hong Kong.

Cameras moved during exposure can also contribute to blurry pictures. To avoid camera/photographer jiggle, magnified by telephoto lenses or by macro lenses used for close-ups, use faster shutter speeds.

2. The zone of sharpness, in front of and behind your point of focus, increases as the lens aperture becomes smaller. For example, you wish to photograph a flowering ginger outdoors in Hawaii. The plant is three feet away. You focus at three feet. Behind the flowers at 20 feet is a house, closer to the camera at one foot away is a palm frond.

If you take this picture using a large lens aperture, almost fully open iris, only the ginger flowers (where you focused) will be truly sharp. If you take the same photo using a small aperture, an iris closed down to a tiny opening, acceptable sharpness will extend from the palm frond to the house and beyond. The zone of sharpness, called depth of field, is a useful artistic control for photographers.

Light

The intensity of light is important in planning your photography. Bright light gives you more possible choices for manipulating depth of field than dim light. Shutter speed and lens aperture work together controlling exposure. With dim light the iris must be open more and/or the shutter speed must be slower. What does film choice have to do with your options? Film sensitivity to light, and therefore correct exposure, varies.

Film Choices

Color fidelity and smooth sharp (grainless) results decrease with a film's sensitivity to light. In general films with high light sensitivity (high ISO numbers) cost more than less sensitive films. High sensitivity (called high speed) films show more grain and less true colors than low to moderately sensitive films. For the lowest cost and best overall results use the lowest ISO film compatible with conditions.

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*ISO has replaced ASA and stands for International Standard Organization while ASA stands for American Standard Association.

For natural light photography use Kodachrome 64 rather than Kodachrome 200 or Ektachrome 400 when subjects are still and you have bright light. Choose fast Ektachrome 100 (slides) or even more light-sensitive Kodacolor 1000 (prints) to capture subjects in low light, windy locations, or with long telephoto lenses.

Negative film, color or black and white, is more forgiving of over or underexposure than slide film. For example, you can underexpose or overexpose Kodacolor film by two stops (iris openings or shutter speed positions) and still get acceptable prints.

A moderate depth of field places Opuntia humifusa *in focus while the background reveals the waterside habitat, but not in detail.*

With a slide film such as Kodachrome a one-stop exposure error is about the limit for acceptable results. Bottom line: Use negative film if you don't need slides. A professional lab can make excellent slides from color negatives if you later need some for projection.

Publishers prefer transparencies for publication so slide film must be your choice if the photographs are needed for print media. Slides are also best for lectures. Excellent prints can be made from slide film.

Color Personality

Films have a color personality easiest to see in color slides. Color differences between negative (print) films are less dramatic because modern printing machines standardize prin tones with filtration. In slide films Fujichrome 50 has electric saturated blues, perhaps jus what you need to emphasize blue-toned flowers or skies in habitat views.

Ektachrome films give bluer (cooler) results than Kodachrome. Fit the film personality to your preference. Match film types to your light source or correct a mismatch with filters suggested in the film instructions.

For example, if you use daylight type colo film under tungsten lights, at a flower show perhaps, use a blue color correcting filte Electronic flash is suitable for daylight colo films without a filter. Tungsten lights are suitable for tungsten light type films without filter. Whichever film you choose keep it awa from extreme heat (direct sun, storage in ho rooms or vehicles).

For field work where relative humidity high (i.e., above 80 percent) put exposed fil into plastic bags with envelopes of silica ge Small envelopes of silica gel come packe with most imported camera and audio equipment. It is also sold by sporting goods store The gel helps remove moisture from the film

At the end of each photographic day dry ou the silica gel and film as conditions perm When electricity is available you can dry ou the gel over a warm light bulb or in an oven o low for 30 minutes. A portable hair dryer also useful for quick drying of camera equipment, cases and silica gel packs.

Photo by Arthur Orans

Astilbe in flower taken with a 50mm lens with UVA filter in open haze with a great deal of ground moisture. The exposure is 1/30 sec at F 11.

Photo by Charles Marden Fitch

Flower buds, open flowers and leaves of Syringa microphylla *'Superba' (lilac) taken close-up fill the frame of this 35mm photograph.*

This photo was taken with a 35mm lens, no filter, during a light rain. The meter reading: 1/30 sec at F 6.3.

Photo by Arthur Orans

Photo by Charles Marden Fitch

Magnolia Plantation and Gardens in Charleston, North Carolina was founded in the late 1600s so plantings are exceptionally mature. Shown here are masses of azaleas and magnolias under towering live oak trees—a photographers paradise.

Bottom Left: *One of the author-photographer's subjects sitting for her at Logee's Greenhouses in Connecticut.* Begoni *'Lady Claire' has been groomed for this appearance.*

Photo by Torah Martin

The photographer is using a macro lens in a high angle position to photograph this sedum.

***Bottom Right**: This hybrid Majestic pansy fills this 35mm slide. The photograph was shot with a macro lens and framed with the leaves below.*

***Below**: A mound of perennial impatiens photographed in open sunlight with a 35mm lens with a polarizer to reduce reflection. Exposure: 1/100 sec at F 11. Depth is created by both the camera angle and the contrast of color up the hill.*

Photo by Arthur Orans

Photos by Charles Marden Fitch

Clematis flowers are photographed to fill this 35mm frame. The leaves provide contrast and interest.

Another scene from Magnolia Plantation and Gardens is filled with a mass of azaleas, water and graceful bridge that attracts the eye to the background.

Photos by Charles Marden Fitch

Dry film in air under 80°F. For example, a fan blowing over the film, or situating the film far away from a hair dryer set on low. Once film has been exposed to dry air for an hour (or after you have done all possible to reduce humidity around the film) return the film container to its sealed plastic film can.

Since film is damaged by excess heat it's important to keep it cool and dry. I carry insulated zipper bags which hold twenty 35mm film cans, good for keeping temperatures under control.

Store film in a refrigerator when possible. Mail film back to a processing lab when you are in a major city. Send it from a post office or trusted hotel. It's important that your film make the trip without sitting in a hot street mailbox or car.

I use Kodalux prepaid mailing envelopes for airmailing Kodak film to a processing lab nearest my location, or to whichever Kodalux lab will get the film first, according to international air service. Processed film will be returned to the address you write on the envelope/mailer.

Formats

A 35 millimeter format is the most practical for all sorts of location plant and garden phoography. 35mm films are widely available in many brands, and ISO ratings. The 35mm size offers slides that fit in universally available projectors. Fine-grained 35mm films can yield large prints of excellent quality. Larger formats require larger equipment, more expenive film.

For domestic location work I may use a ingle lens reflex Mamiya camera which yields big two-and-one-quarter inch by two-and-hree-quarter inch slides, but for field phoography under tough conditions I prefer the ractical 35mm format. Cameras smaller than 5mm are often less versatile than popular 5mm models and they give lower quality hotographs.

esign

he single lens reflex 35mm camera is a veratile compact design well suited to field photography. I recommend a model with an interchangeable lens but even a low-priced model with a fixed lens is better suited to close-up work than a rangefinder design. With a single lens reflex you see what will record on the film. You can judge precise focus, composition and depth of field.

A light-weight tripod can be used as a brace. It acts to steady the camera. Here the photographer is capturing a close-up of Aranda, *an orchid in Singapore.*

Lens Choice

In field photography I often want to show a plant PLUS the habitat. For these medium to wide views a normal 50mm lens, usually sold with 35mm cameras, is suitable. For frame-filling close-ups a 50mm lens must focus closer than the usual two or three feet. An inexpensive way to focus closer is to use screw-in close-up attachments that fit on front of any lens, much like a filter. A set of three such screw-in close-up lenses of varying power cost under $20.

A 50mm macro lens is useful for taking close-ups of garden flowers.

More versatile, and giving sharper overall results, are macro lenses designed to focus from infinity to several inches. A good general-purpose macro lens is in the 50 to 55mm range. If you want to be further away from the subject choose a 90 to 105mm macro. Modern zoom lenses can deliver quality almost equal to top brand single-focal-length lenses. A zoom lens gives you in a single lens, a wide range of choices—for example, 35mm (moderate wide angle) to 100 or 150mm (moderate telephoto), plus a "macro" position on most modern zooms.

Note that the macro position on most zoom lenses does not permit as close a focusing distance as true macro lenses. The primary reason to use a zoom is convenience. With a zoom you have only one lens to carry for wide, medium, tele, and moderate close-ups.

A zoom is often less costly than several separate lenses. My main reasons for using single-focal-length lenses for some work are that they deliver slightly better quality, ofte let in more light (wider maximum apertur per dollar spent), have true macro design t fill a 35mm negative with a subject only two t three inches across.

Useful Filters

To protect equipment keep a Skylight filter o every lens. Using a $10 to $20 filter to prote a $200. + lens is good insurance. I have ruine several filters doing field photography rough habitats, but thanks to the protecti Skylights my lens elements were not damage

A Skylight filter is slightly pink. Althou the color cast is so slight that no exposu increase is needed, the filter will help remo excess blue light often found in open shad

To increase color saturation and rend blue skies a deep tone, use a polarizing filt With black and white film the most use filter is a yellow-green. The yellow-green re ders foliage a lighter shade of gray and tu blue sky darker, making white clouds show

On top of every filter put a lens shade. Us size made specifically for each lens. A le shade (hood) keeps light off the front gl thus eliminating the flare and distracting li patches that occur when the lens sees a dir light source.

Camera Supports

Tripods, monopods, and solid places to your camera for slow exposures are usefu location work. When the air is still you h the option of using slow-shutter speeds (30th to 1 second).

With a slow-shutter speed you can us smaller iris opening (f/stop) thereby incr ing depth of field. Tripods also help with cise composition. When your camera is st you have time to arrange the subject, stud all areas of the frame. For the most dram composition include only important ments in each view.

When doing field photography I often c a medium-sized tripod, a smaller, ligh weight model than I use under studio co tions. If even a medium-sized tripod is imp ıcal to carry I bring along a 19.7 ounce model ıat stores at 15 inches but opens to just over 0 inches. This compact model fits in the ottom of a large camera bag or tucked into ıy belt.

When even this size is too much to carry I lways have a folding four inch "Ultra-Pod", ffered in some sporting goods catalogs. This ny model has a ball-joint head, three legs and self-gripping fabric strap. Once the camera is tached you can strap it to a post, tree, or use ıe legs. Since the legs are only four inches tall often put this mini-pod on top of a rock, log, ehicle or camera bag.

ıutter Facts

) cope with subjects blowing in the wind use shutter speed 250th of a second or faster. If at's not possible then use electronic flash hich will "freeze" the moving subject.

When the subject is still you can make good ıtural-light photos with a slow-shutter speed long as the camera is steady. When using a ɔw-shutter speed, release the shutter with a ble release or use the self-timer (found on ɔst modern 35mm cameras). Just pushing

Modern 35mm cameras have computer controlled flash units. In this photograph is shown a Nikon 8008 with a SB-24 flash which will measure light from behind the lens and so provide only enough brightness to obtain an ideal exposure.

bels indicate lens positions so the phograpber can find a particular lens quickly. ear tape placed over the stick-on labels keep em in place. Extra air-cell plastic provides ditional protection inside the case.

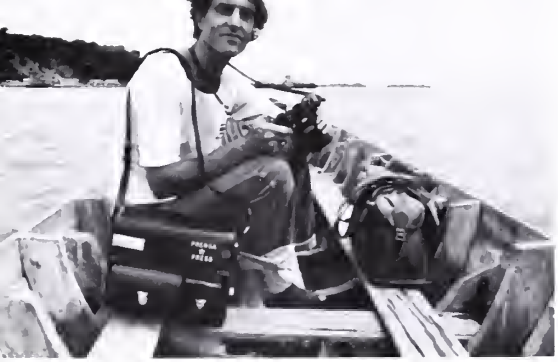

Photo by Sompong

Camera bags protect equipment from salt spray and sun in this open boat where Fitch is on location in Thailand. In case of rain plastic bags will be used to cover all equipment.

down on the shutter release often causes slight camera movement leading to blur at slow-shutter speeds. A cable release is much softer than finger pressure. Using a self-timer gives eight to ten seconds elapsed time between manual shutter release and the actual exposure.

Light Control

Portable electronic flash is a versatile light source for location work in the field or at flower shows. Modern units are automatic under most conditions. Some camera/flash combinations can determine correct exposure at the film plane. Even low-priced clip-o (hot shoe) models offer auto intensity contro over a range of two or three feet to 20 or 3 feet. Electronic flash is the best way to cop with moving subjects and low light.

If direct flash is too harsh for your artisti goal, diffuse the light. Diffusion material (domes, screens, fabrics) are available f many popular flash models. Using a white car or silver reflector on the side opposite you flash will fill in dark shadows. See the featu "Open Shadows, Wrap-Around Light" for mo details.

A general goal in handling light for pla portraits is to reduce extremes in contrast. ratio of two or three iris openings betwee shadows and highlights is the practical rang for good quality prints and slides. When lig is very contrasty you can get better photos b filling in the shadows (reflectors or flash) by reducing the harsh light with diffusi material.

For natural-light color photography t best conditions are cloudy-bright. When t sun is just hidden behind misty clouds, sha ows are open yet colors are still bright. Rin light flash units give a result similar to cloud bright days. The ring-light flash has a circul tube that fits around the lens.

Ring-lights deliver even, flat light. Mo complex ring-lights have two, three or fo

A light-weight tripod used on top of a car hood provides needed support for a camera and telephoto lens.

Photo by Charles Marden Fitch

Your body can form a support for your camera in areas where a tripod won't work, such as in this Thai jungle stream.

separate tubes inside the housing. Each tube can be controlled individually. By having one brighter than the other, or one tube off but three on, the quality of illumination is more three-dimensional, not so flat.

Accessories

Photography under adverse conditions (rain, dust, mud, fog) is easier with a few small accessories. For example here is a list of a few helpful items I carry for field and travel photography:

Protective case for camera and lenses (shoulder bag or pack)
Batteries (extra) for camera and flash
Cleaning tools (air blower, lens tissue, lens cleaner)
Small set of screwdrivers
Flashlight
Plastic bags big enough to cover camera cases
Insect repellent
Knife with many blades and tools (i.e., Swiss army type)
Drugs to treat fire ant and bee stings
Moist towelettes in foil envelopes
Reflector foil (Rosco Fetherflex silver material)
Insulated bag to keep film cool
Extra lens caps (front and back)
Notebook and pens
For remote locations add: water purification tablets, maps, compass and similar field-work equipment that you would want even if photography where not a goal.

Many of the methods described here are based on my work in the tropics since most indoor plants come from tropical habitats. However the basic recommendations for location photography are just as useful for capturing a native species in your local nature reserve or prize specimens at a flower show.

Text based on a feature originally appearing in the American Orchid Society Bulletin.

A sturdy but light-weight tripod with legs adjustable to different angles is a good choice for rough terrain. This Bogen model 3001 is shown in a boulder-strewn gulch in the Mojave Desert.

Photo by Charles Marden Fitch

PHOTOGRAPHY UNDER GLASS

Tovah Martin

Who can resist the urge to photograph in a greenhouse? Everything looks great under glass. Protected from the nibblings of insects, sheltered from scorching sun and beating rain, plants are prime indoors.

Greenhouse photography has advantages as well as drawbacks compared to shooting in the outdoors. During winter, a greenhouse is the only place where nature is in full flower despite the weather outside. Ardent plant photographers have no choice but to turn their lenses toward the things growing inside. But, in summer, many photographers still opt to keep their cameras under glass rather than battling the elements outdoors. Although I'm always tempted to set up outside in midsummer, I usually stay indoors.

Wind is the factor that always convinces me that the shooting is better indoors. A little breeze can ruin a close-up, a faint wind can send my background crashing on top of a painstakingly arranged set-up. In a greenhouse, the photographer has complete control over air movement. You can easily turn off fans while shooting — you will probably swelter, but leaves and flowers will remain perfectly still. Some of the sharpest pictures are shot under glass.

I also prefer the filtered light in a greenhouse compared to the sun's harsh rays. Greenhouse light is subdued, causing colors to glisten. Of course, the quality of greenhouse light depends on the type of structure in question. Plastic greenhouses tend to shed a yellow cast on white flowers while making glossy green leaves appear pale yellow. Acrylic houses lend a crisp, pure tone to photographs and clean glass houses make colors sparkle. The time of day also has an effect. Early morning sun rays usually look yellow on film and evening light often appears bluish when filtered through greenhouses. Noonday sun gives the truest colors.

Tovah Martin prepares her plant subject at Logee's Greenhouses. The black cloth hood makes precise focusing easier in the bright greenhouse situation. The sturdy tripod permits slow exposures.

The old adage warning against photographing flowers in full sun doesn't hold true in a greenhouse. Go ahead and shoot in full sun — if you can endure the sun's heat magnified under glass. It's a sweaty job — but you'll probably get better pictures than you ever accomplished outdoors.

If you shoot on a bright day, you won't need lights under glass. A flash is only necessary to provide "filler light" to enhance the center of a tubular blossom or encourage a dark flower to pop out from its background. Natural light is usually sufficient in late winter, spring and summer. In autumn and midwinter, you might have problems with low-light levels. Try using faster film, a tripod and timing for noon daylight to solve your troubles. In any light, a tripod is essential for photographing in the greenhouse.

One of the greatest advantages of photographing in a greenhouse is the absence of shadows. When filtered through glass or plastic, light is diffused and falls softly and evenly on plants. You are saved from those deadly

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Tovah Martin is the staff horticulturist at Logee's Greenhouses of Danielson, CT. When she isn't answering houseplant questions, she is busy photographing for Logee's color mail-order catalogue. Her first garden book, Once Upon a Windowsill, *was recently published by Timber Press.*

dark spots that creep into a camera's vision but are rarely noticed by the human eye. Under glass, glaring reflection from shiny surfaces (such as leaves) are avoided. If your light is coming from only one direction, or if you want to illuminate the background of a shot, use a reflective screen. There are all sorts of reflectors available, but a sheet of cardboard covered with aluminum foil does the trick cheaply and efficiently.

Although greenhouses solve many light problems, they also pose dilemmas that do not normally plague outdoor photographers. For example, an indoor photographer has to grapple with the pipes, benches and vents of the greenhouse framework. Even when the structure doesn't get into the picture, it can cause uneven light.

There are all sorts of opportunities for a photographer under glass. Sometimes a greenhouse photographer simply wants to document the color of a flower. A quick close-up will suffice. More often, a proud grower wishes to snap a permanent record of some beautiful specimen that he or she has been coddling for several years. The greenhouse is a great place to take plant portraits.

Plant portraits pose a unique set of challenges compared to close-up work. Before you start, scrutinize your botanical model with a critical eye. Every leaf and flower must look perfect. When something is amiss in a photograph, it stands out.

Next, consider the location. Find a spot with even light and minimal shadows. Think about the set-up. One of a greenhouse photographer's biggest headaches comes from grappling with a crowd of competing plants. Group shots taken in a greenhouse are rarely successful unless subjects are segregated into a small cluster.

Also consider the scene behind the plant. Occasionally, it is possible to put the background out of focus until it looks like a confetti of colors. But, that technique becomes more difficult when you have a large plant to photograph. A backdrop is often necessary to focus attention on the subject and delete upstaging debris in the background. I frequently use a backdrop for close-ups, and I almost always use one when taking portraits of full plants.

Artist's posterboard or rolls of seamless background work well, especially if you put the backdrop far away. I usually use blues (pale blue looks like sky at a distance), greens and black. It's wise to choose a muted color that picks up some hue in the flower. Complementary colors occasionally work, but they usually look too contrived. When in doubt, use black. Always select a non-glossy background that won't bounce light back into your lens.

If possible, put the backdrop in the shadows and let the flower or plant sit in the sun's spotlight. Granted, it's an aggravating and time-consuming ordeal to arrange plants, select a matching backdrop and simultaneously prop the cardboard so it doesn't come crashing down. But the results generally compensate for the effort. A staged shooting can easily take hours — before you start setting up, make sure that the sun is going to stay with you for a little while.

In addition to a camera, a tripod, a backdrop and a botanical subject, I use a handful of other, nonessential, items. I work with a hand-held light meter, a black sheet of fabric covering my head and the viewfinder to cut off stray light, and a lens shade to eliminate glare on the lens glass. Although these items are not necessary, they are always helpful.

Finally, before actually taking light readings and figuring exposures, primp your model. Pots should be washed clean before shooting, leaves must be wiped and the plant has to be spruced until it looks perfect. Now you're ready to shoot. Take a few exposures at different settings — you won't want to repeat the setting-up process again.

Practice makes perfect. And greenhouse photography becomes easier as you gain experience. With time and practice, you'll choose favorite shooting locations in your greenhouse and you'll learn which time of day brings the best light. And yet, the beauty of photography lies in the fact that every picture poses unique challenges. Expect the unexpected — sometimes the results are wonderful.

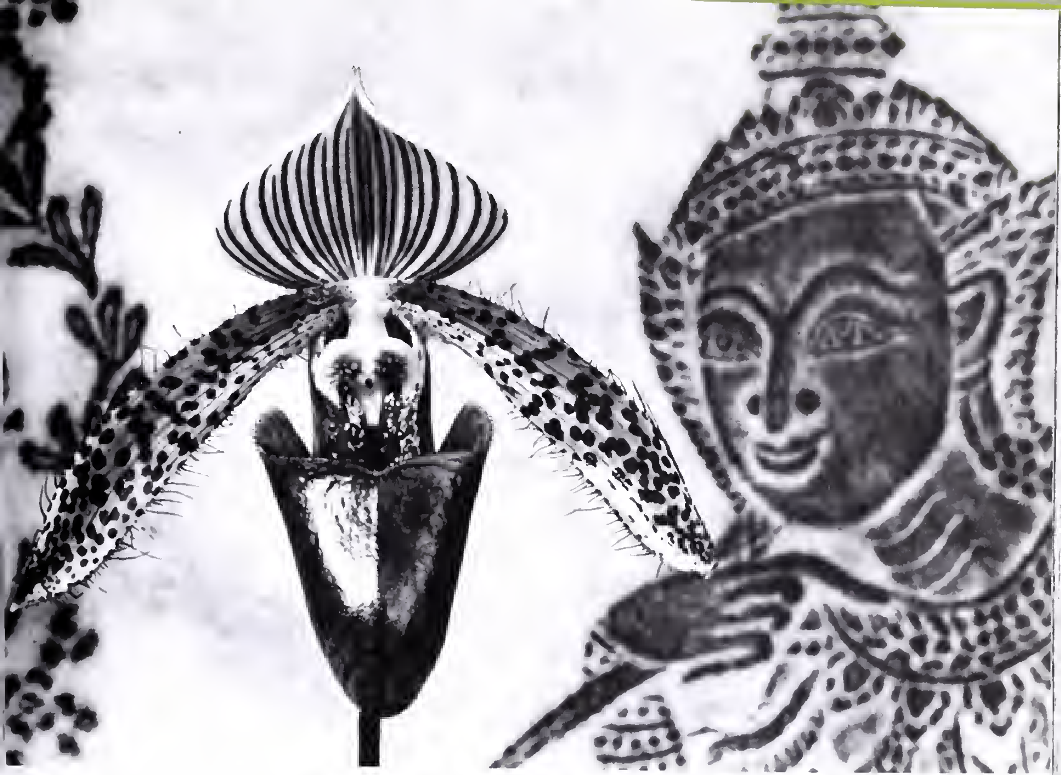
PROFESSIONAL TECHNIQUES ILLUSTRATED

Charles Marden Fitch

The difference between professionally created photographs and snapshots is often a matter of concentration. Professional photographers and artistically oriented amateurs take the time to concentrate on precise techniques that lead to tight composition, sharp focus, dramatic close-ups.

Macro lenses offer quick focus adjustment from infinity down to ½ or 1:1 (actual film size). With a macro lens that offers 1:1 magnification a flower two inches across would fill a 35mm slide or negative. Shown here are three macro lenses focused on the orchid at the right. Far left is a 200mm lens, center 105mm and at the right is a 55mm lens. All will photograph the Phalaenopsis *flower at the same size.*

All photos by Charles Marden Fitch

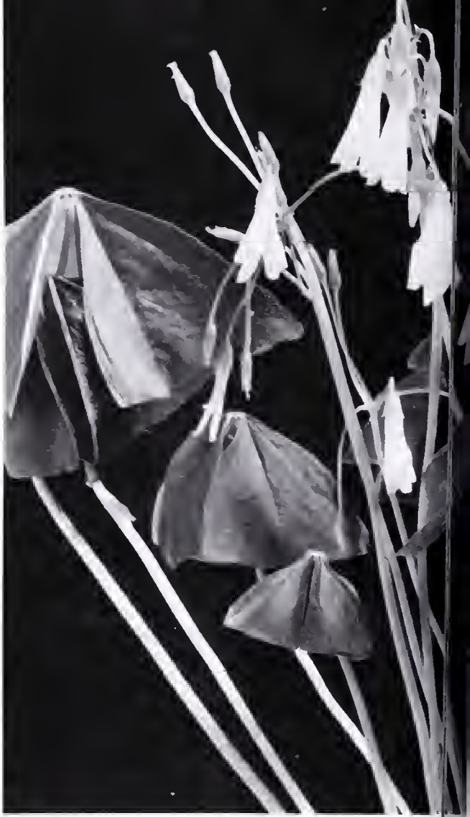


*ackgrounds often complement and provide
nterest in photographs. Here* Paphiopedilum *Ori-
ntal Spice is photographed against a Thai tem-
le rubbing.*

Tools that help produce professional results
re available at fair prices. These include ver-
atile single lens reflex cameras, a wide selec-
ion of sharp lenses, many tripod designs,
eflector and flash units, from tiny clip-ons to
owerful studio strobes.

All these mechanical items contribute to
ccess when they are used in appropriate
tuations by sensitive photographers. This
andbook provides many suggestions for cap-
ring plants and gardens on film. The follow-
g photographs show some of the techniques
ed by professionals to produce dramatic,
formative photographs.

*tripod provides support and can help improve
mposition—here the rice terraces in Luzon,
ilippines. This one is light-weight for travel
e and will work on a calm day, but a heavier
odel is needed when the wind blows.*

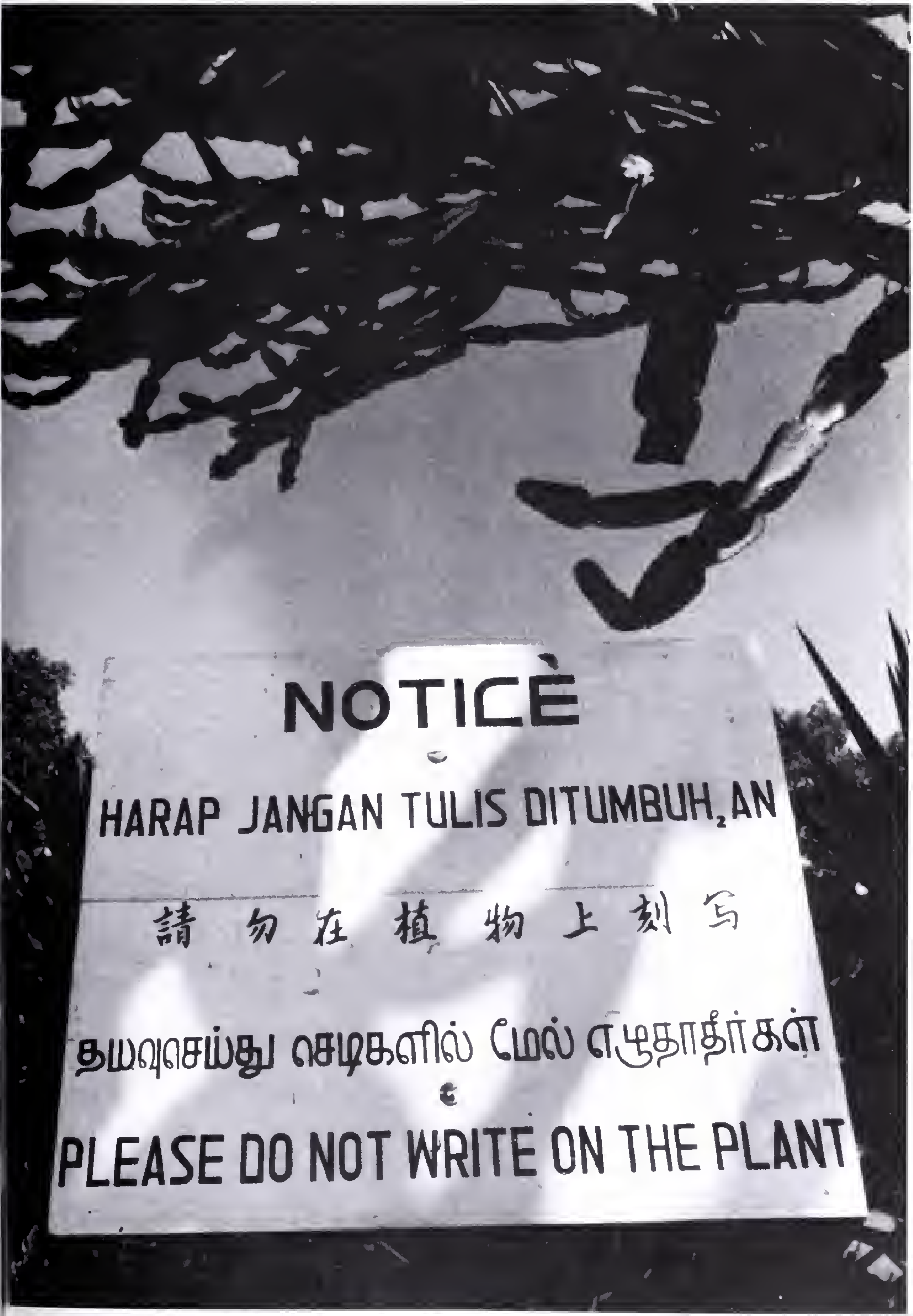


Oxalis regnellii *thrives in a bright window or under fluorescent lights.*

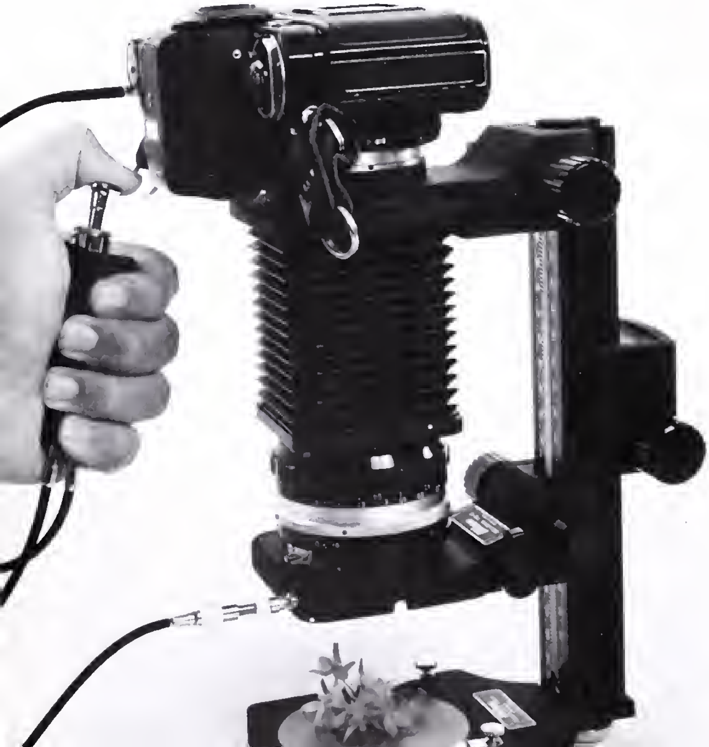
The same plant photographed at night shows the flowers closed.

Here is a dramatic portrait of Epithelantha micromeris *created by using careful lighting including a reflector below. The hand shows relative size.*

Look for unusual views to photograph. This sign in Malay, Chinese, Tamil and English protects an African Euphorbia *at the Singapore Botanical Garden. The photograph includes a Euphorbia branch at the top and as a shadow on the sign.*


NOTICE
HARAP JANGAN TULIS DITUMBUH2AN
請勿在植物上刻写
தயவுசெய்து செடிகளில் மேல் எழுதாதீர்கள்
PLEASE DO NOT WRITE ON THE PLANT

For larger than life-size images on film use a bellows and lens reversed for maximum sharpness. Shown here is a double cable release used so that the lens iris can remain open for focusing but close quickly for the actual exposure.



sequence of photographs captures the dramatic evelopment of Lentinus edodes, *the shiitake ushroom, from budding spawn to mature owns photographed with chopsticks.*

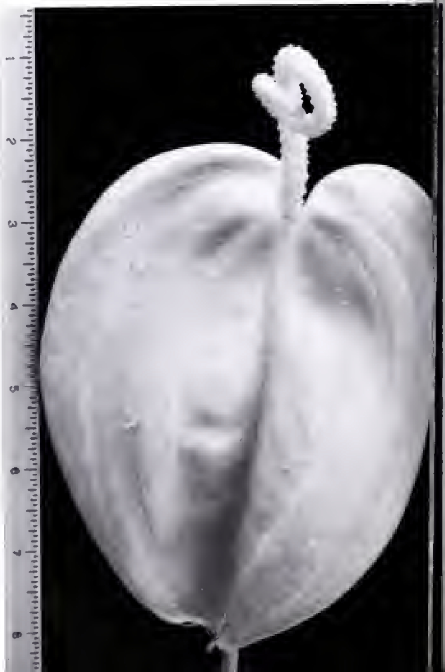
For revealing close-up photographs fill the entire frame with the subject matter. Here a spray of Phalaenopsis *orchids includes both front and profile views.*

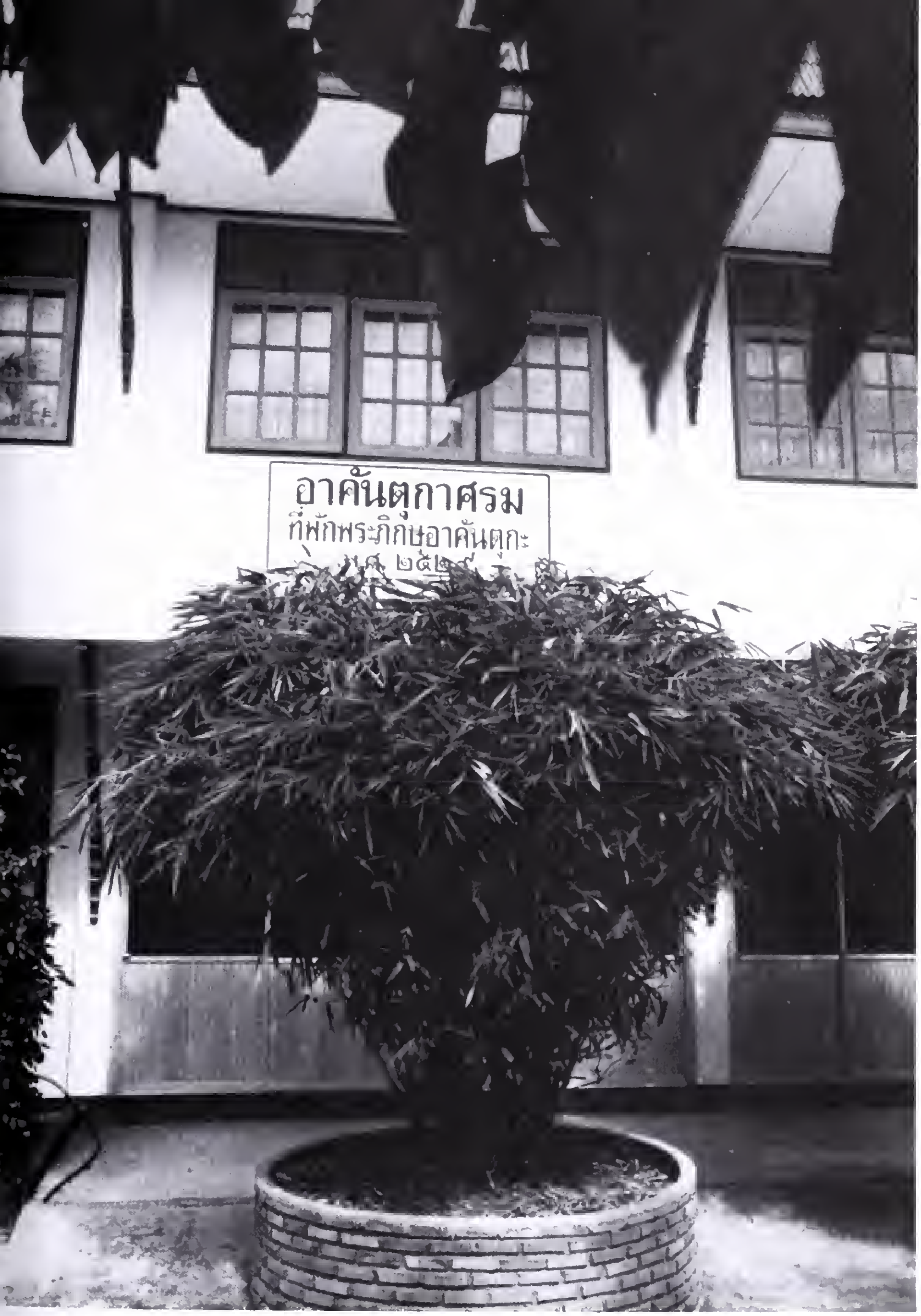
Well-designed tripods, such as this Bogen model, have sturdy controls to help with precise compositions.

Tall flowering Trichocereus *species growing outdoors at the Botanical Garden, University of California at Berkeley looks dramatic against a cloudless sky. The careful selection of angle includes stems, fruit and flowers of this cactus in various stages of development.*

Creating your own background allows you to control that element—used here, a plain white card so that the yellow lily 'Harlequin' would stand out.

Add a ruler to scientific photographs to show t precise size of the subject. Photographed here is Anthurium scherzeranum.





areful composition improves this portrait of a amboo clump growing outside a temple comlex in Thailand. Overhead foliage frames the iew, the sign in back gives some clues as to ocation and the vertical frame suits the upright amboo growing from the round brick planter.

PHOTOGRAPHING THE GRAND LANDSCAPE & CLASSICAL GARDEN

Derek Fell

Several factors make the photographing of large gardens unusually difficult — the light can range from dark (as on a dismal, rainy day) to bright (as on cloudless, sunny days); the time of year can produce a lack of color (as in winter) or an abundance of color (usually in spring); also the plants can vary from disappointing one year (usually after a severe winter) to sensational another year (when nature has cooperated in providing all the right conditions). It is not easy to use artificial lighting in gardens and so we must rely almost entirely on natural light and the whims of Mother Nature, which is why garden photography is considered one of the most challenging forms of photography. I prefer to shoot large gardens on a slightly overcast day, rather than a sunny day — particularly a day with high cloud cover — since clouds diffuse the light, reduce harsh shadow contrasts and help sharpen colors. Some gardens even look good on a rainy day which tends to brighten up colors even more than the diffused light alone. Oriental gardens, for example, with their emphasis on stone, evergreens and water can look fabulous in light rain, the droplets of rain shining up stone, producing ripples on water and enhancing the predominantly green landscape.

Though floral displays seem to last for weeks, it is amazing how a garden changes from minute to minute when the light and mood of the season become an important part of the composition. Wisps of mist and islands of light from a break in the clouds can be gone in a flash. Even a flowering cherry and an azalea seem to have a particular day when each is at its "peak of perfection". A day earlier or a day later can produce a totally different floral display. Good garden photographers learn to "read" a garden quickly, to anticipate those perfect picture opportunities that are oftentimes so fleeting.

Morning light generally produces the best garden pictures. A bright, sunny day can yield disappointing results, offering little more than the opportunity to take what I call "cliché" pictures — the kind you see on a postcard rack. Morning light offers an opportunity to take "mood" pictures, such as a woodland pervaded with mist, or shadows streaked across an expanse of lawn. Late afternoon on can produce different effects from light. After about 3:30 p.m. in summer, for example, sunlight produces a lot of reddish tones, while a colorful sunset can offer the opportunity for some dramatic silhouettes. "Backlighting" can improve a so-so garden scene. Instead of always shooting with the sun behind you, try

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Derek Fell is author of "How to Photograph Flowers, Plants & Landscapes" (HP Books). He is a frequent contributor to Architectural Digest, Connoisseur *and* The New York Times Magazine, *specializing in photographing gardens worldwide, with an emphasis on garden design and portraying the romantic qualities of gardens.*

Careful composition has framed the Temple of Love at Nemours Garden near Wilmington, Delaware. The scene has depth and interest because of attention to composition details.

some scenes with the sun ahead, particularly through trees. This will give translucent objects, such as leaves and flower petals, a wonderful glow. However, you should use a lens hood to shade the lens from the sun or your exposures may show ugly streaks of extraneous light.

The focus of this photograph is concentrated on the candelabra primulas in the foreground. The overall view is of the rock garden at the Leonard Buck Garden in Far Hills, New Jersey.

The best time of year to shoot a garden depends on the design and planting schemes of the garden, but a good photographer with an observant eye will never let the season hamper his ability to take good pictures. Even in winter when there may be little color, images that accentuate *textures* (such as bark and the patina of old stone) and *form* (such as the arching canes of bamboo silhouetted against a wintry sky and the sinuous branches of a contorted hazel) offer wonderful photo opportunities.

Obviously, a bulb garden will always yield its best color in spring, and a garden of annuals may reach its peak in midsummer. But good timing may depend on more than just choosing the obvious season. For example, a woodland garden can have a reputation as being sensational in spring, with freshly opened leaves forming a high overhead canopy and wildflowers carpeting the forest floor, but autumn may yield even more impressive compositions as the deciduous trees turn russet colors. And in winter, under a blanket of snow, the scene again changes — especially if a stream runs through to add valuable depth and contrast to the snowscape.

Great gardens rarely depend on one particular plant to make them look good, but certain plants do have the ability to create extremely colorful effects. Mass plantings of azaleas, dogwoods, daffodils, iris, daylilies and bluebonnets are examples of plants that can "paint" a grand landscape. Mass plantings like these tend to produce different effects in different years. Several years ago I wanted to visit Texas to photograph bluebonnet displays and found that a dry season had produced disappointing color, but the next year winter rains had been sufficient to create what was described as "the best bluebonnet displays in 20 years". That's when I headed for Texas!

When taking pictures in subdued light it is essential to use a tripod. Grand gardens generally have a lot of depth to them and it's important to get as much in focus as possible. This makes it essential to use high f/stops, such as f11 and f16 and even higher if your lens will allow. In poor light these high f/stops are possible only by keeping the camera absolutely steady by means of a sturdy tripod since you generally must use a slow shutter speed of one-quarter second or even one or two seconds in duration.

Another tip to help achieve sharp pictures is to avoid focusing on infinity, but to try to focus on something definite in the middle-ground or foreground, such as an interesting structure, a dominant tree or clump of conspicuous flowers.

Choice of film is another vital factor affecting the quality of your garden pictures. Avoid high-speed film, 25-, 50- and 64-speed films are the best to choose for good color saturation. My own preference is Ektachrome 64-speed "professional" film. I use slide film and if I want prints I can make inexpensive conversions from the best slides. If I want black and white prints I also make conversions from the slides. You can obtain "professional" film by special order through a camera dealer if he doesn't have any in stock. Ektachrome-64 film is extremely good at capturing blues and greens — very important colors in landscape and garden photography. However, its color stability can only be maintained by keeping the film cool and processing it soon after use. Kodachrome tends to produce better reds, but in my experience its greens are too "muddy" — particularly in shade and poor light situations. Fujichrome 50 is my second choice after Ektachrome 64.

Never take your film to a one-hour photofinisher or similar mass-market film processor. I have found their photo finishing to be unacceptable, mostly because they often use inexperienced personnel and stale chemicals. Choose a good custom-processing house — or better still — use Kodak photo finishing. Kodak's standards of quality are the very highest.

Metering a garden for the correct exposure can be tricky, especially on sunny days when a wide variation of tones exist, from shaded to sunlit areas. Color film is not as versatile as the human eye in capturing detail in situations where there is high contrast. The best we can do is strike a happy medium or else decide what we want to have perfectly exposed — the shade or the sunlight. For example, if I am in a woodland with a tremendous contrast between the woodland floor and the overhead tree canopy, which may be brighly lit, I will decide what I want to show most — the woodland floor or the overhead tree canopy — and expose for one or the other with the aid of a "spot meter".

Spot meters are available as self-contained units, but in recent years some 35mm cameras — such as the Olympus system — have a spot-metering mode actually built into the viewfinder as one of the metering choices you can make. With this feature it's possible to take perfect pictures without bracketing, which is the practice of shooting one exposure at the camera's light reading, plus a stop above and a stop below as insurance. I find that with the Olympus system of built-in spot metering I rarely have to bracket, except in situations where I deliberately want to underexpose or overexpose. If in doubt over a tricky lighting situation in a garden, I generally find it's better to err on the side of slight overexposure rather than underexposure. This is particularly true in gardens with a lot of "greenery", since greens in a landscape usually can take a lot of overexposure before they look unacceptable.

When everything else is technically correct — lighting, focus, exposure, shutter speed — the final criterion for a sensational garden picture is *compostion.* This you learn not only from practice but also from studying the work

The bridge in the Fern Garden at the Morris Arboretum provides an appealing design element especially in contrast to the graceful, feathery fern fronds. The bridge is photographed off center to show the small stream leading under the bridge.

The secret of capturing good snow scenes is to photograph soon after the snow stops and before the sky clears. This timing takes advantage of the diffused light that a snow sky provides. The interestingly patterned bench is the focal point of this Deerfield Garden photograph.

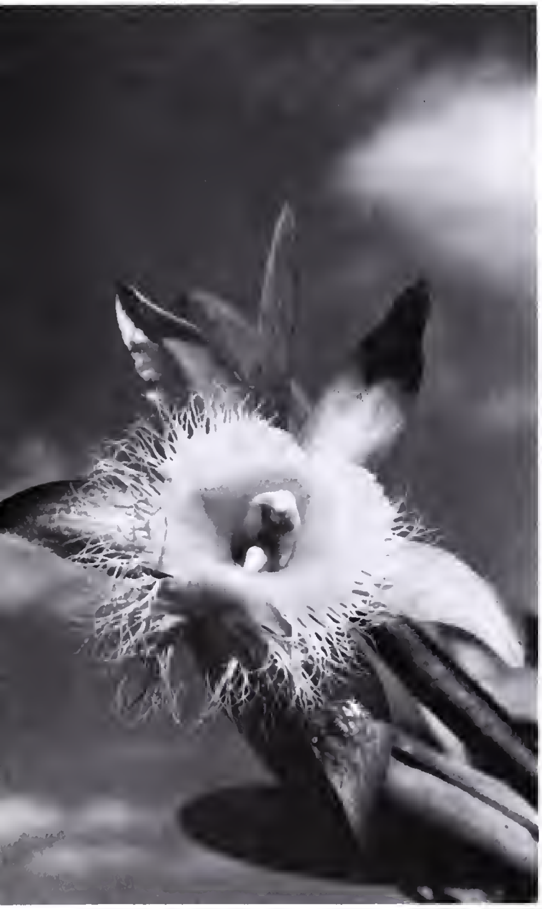
of other good photographers. For me a simple technique I call "framing" works wonders. Instead of taking a garden scene flooded with light as a flat panorama, consider adjusting your position so you have a clump of something out-of-focus in the foreground. It can be a spray of blossoms, some silhouetted leaves of a tree, lawn shadows across the ground — anything that helps fill in the edges like a picture frame.

When visiting gardens I always look for three types of composition — *overall views, specific views* and *close-ups*. The overall views help to establish a sense of place, give some idea of scope, capture a feeling of the environment. For example, if a garden is surrounded by mountains, try to include some of the peaks; if it is a seaside garden, include a portion of ocean, no matter how small the section of water might be. These overall views generally produce the most stimulating pictures. In order to include enough of the surroundings, a wide-angle lens (28mm) is sometimes needed, but a standard 50mm lens works well when using a 35mm camera system. Specific views usually concentrate on planting schemes and design concepts. They can show important features of a garden — a lake, a bridge, a flower garden or waterfall, for example. Close-ups mostly highlight details of individual plants or design details such as the carving on an urn or the expression on the face of a statue. With plant close-ups you can shoot a single flower, a cluster of berries, a group of leaves. You cannot create a good garden feature shooting only close-ups. They are mostly "fillers". It's the overall views — the vistas in particular — that make the best garden pictures.

For further study, I recommend a copy of "Deerfield — An American Garden Through Four Seasons" (Pidcock Press). A hardcover volume containing over 100 full-color photographs, it describes in words and pictures the making of a great American garden, showing scenes at every season of the year under every kind of lighting situation. Photographed over a period of three years, it won a Best Book award from the Garden Writers Association of America and contains a chapter explaining how the photographs were taken. Copies can be obtained from Pidcock Press, Box 1, Gardenville, PA. 18926 ($35.00 including shipping).

OPEN SHADOWS, WRAP-AROUND LIGHT

Charles Marden Fitch



Brassavola digbyana *photographed in direct sun without a reflector to fill harsh shadows.*

Portraits of flowers and plants often look best without harsh shadows. Dense shadows hide details of shape and color. But when light wraps around a subject, the shadows open and the eye, undistracted, is drawn to the plant. I especially like to apply lighting with open shadows to close-ups of complex flowers.

Light is a photographer's paint. I often spend five or ten minutes studying how to light a flower. By manipulating my lights and associated reflectors I can paint the subject with light in a revealing way.

To make light reach all visible parts of a complex flower, such as an orchid, I may reflect the main light into a photographic umbrella, then point the umbrella at my subject. With the umbrella off to one side the ligh quality is directional but soft and broad. To fil in the opposite side I use white or silve reflectors.

When a directional light isn't needed I pu the umbrella right over or alongside the lens This provides a flat, even light. With some subjects I may use a weaker direct light from behind left or behind right. This back ligh helps separate a subject from the background It also makes hairs or ruffles in petals show u

Another useful light control for diffus broad lighting is called a light bank. Variou brands use slightly different systems but th general design reflects a powerful electroni flash burst through one or two sheets of diffusion material. The light box or bank is ofte positioned above a subject. I like this sort o lighting for displays of vegetables, flowers in table settings, how-to-do displays involving pots, plants and tools.

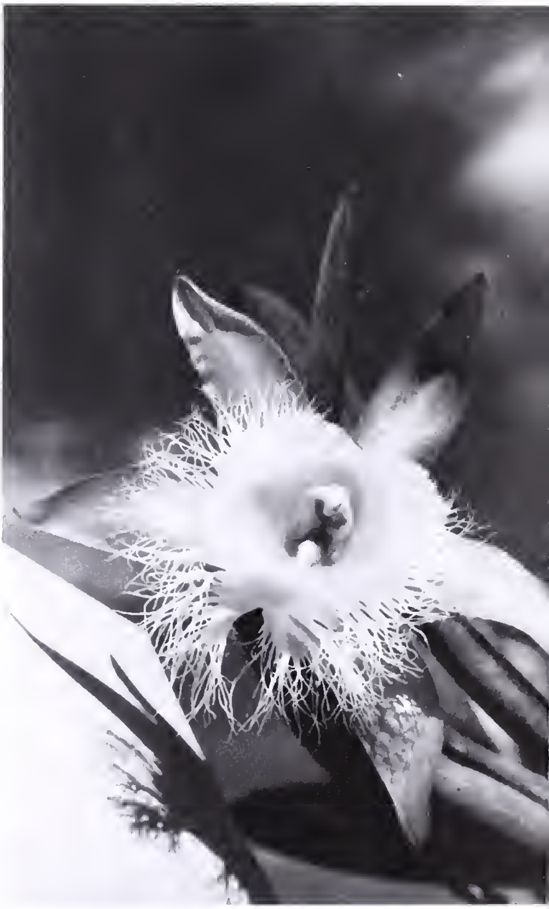
It is expensive to use this system since light bank diffusers require strong cool electronic flash but the quality of light delivered is useful for many horticultural subjects. Consider using light banks and powerful electronic flash if you are dedicated to horticultural studio photography. (For another approach to diffuse overhead lighting see *Photography Under Glass.*)

Reflective Surfaces

The umbrellas I use are white or silver. Silver provides more contrast and sparkle. White gives a flatter look. A similar difference occurs with different reflective surfaces inside a light bank. For very big subjects I might use a silver umbrella as the main light, then use a white umbrella on the darker side to fill in the shadows.

My reflectors are also matt white or silver. White reflectors are sections of stiff matt board or sections of foam core board, both available at art supply stores. Silver reflectors can be made from silver mylar adhesive paper, sold in hardware stores, or from aluminum foil on cardboard but for the most efficient effect I prefer silver reflectors made for photography.

My favorite reflectors are: Tota-Flectors made by Lowel Light Co. and a flexible, but tough foil called Rosco Featherflex made by Rosco Lab. These reflectors are sold by professional photography stores. Another useful



B. digbyana *photographed in direct sun with a white card used as a reflector to fill in shadows. In a final photo the reflector card would be outside of the frame—below and left.*

All photos by Charles Marden Fitch

Use a lens hood or shade to keep stray light off of the lens elements and filters. Stray light reduces contrast and causes flare spots.

reflector design involves reflective fabric on a twisting metal wire frame. The frame twists to fold into a circular size about one-third the open size, very convenient for location work.

Light Source

The light source you use to bounce into an umbrella and reflect into the shadows depends on your budget, artistic preference and working conditions. The least expensive light source is sunlight but it's not constant. Photoflood lamps are inexpensive but hot, and they change color temperature (get redder) as they age. Quartz-iodine lamps (halogen) are small, bright, and retain their designated color temperature with age. An example of fixtures that use quartz-shell halogen gas lamps are the Lowel lights.

All of the constant light sources (sun, photofloods and quartz lamps) let you see what the light is doing before you take the picture. With this advantage you can tailor the light to each subject, avoiding unwanted shadows and reflections. The main disadvantage of both quartz and photoflood lamps is heat, and a big demand on electricity.

For example, to get good depth of field (deep zone of sharp focus) one must use a small aperture (iris opening). To use a small aperture but still be able to use a shutter speed under one second, very bright lights are needed.

Using a high ISO film ("fast film") means you can use a small aperture at faster shutter speeds but a general rule about films is this:

The author is shown using a Balcar electronic flash reflected into silver (top) and white (center) umbrellas for open shadow lighting effects.

Here light weight Rosco Featherflex silver reflector foil is being used to fill in shadows for a jungle habitat close-up.

Film cost and grain effect rise with the ISO. Color quality and fine grain is best with low ISO films. For maximum quality slides use ISO 25 to 64 film. For best quality prints use ISO 25 to 100 negative color film.

Flash

My favorite light source for consistency is electronic flash. Flash is quick, bright, cool. A disadvantage of inexpensive portable flash units is that the final light can't be previewed. More costly studio flash units have built-in modeling or focus lamps which reveal what the final flash burst will look like.

A compromise to expensive studio electronic flash units with modeling lamps, is a low-wattage floodlight held in the same position as your small flash unit. With some practice you will be able to correlate what the tungsten lamp shows with what actually occurs when the flash goes off. With this system you are actually making your own modeling lamp.

Keep Tests

When you first experiment with any new lighting system keep notes and save all of your test exposures. Write down details for each frame. File the photos along with the associated notes. Use these test exposures to refresh your memory next time you use the same light arrangement.

Tungsten halogen quartz lamps in Tota light fixtures provide intense light when used as a flood (top left) or softer light when reflected from an umbrella (right). The lamp at the bottom right has a gel frame which can hold filters (to balance light color) or a diffusion material.

PHOTOGRAPHING PERENNIALS

Muriel and Arthur N. Orans

Perennials present an intriguing challenge to even the most experienced photographer. To capture them on slides or prints you must deal with the changing atmospheric conditions.

Take the time to familiarize yourself with your subject. If you garden, you have an image of what the plants look like. You've seen your subject under different lighting, and through the seasons. Take several pictures throughout the year to create a record.

Most anyone utilizing a modern auto-exposure camera can take correctly exposed pictures. Here are a few exposure and lighting considerations:

Exposure and Lighting Control

Take perennial pictures at any time of the year in misty rain, fog, snow, blazing sunshine, early morning, at dusk or after nightfall with artificial lighting. These atmospheric conditions provide challenges and opportunities for pleasant rewards.

We recommend the purchase of a Kodak gray card available at most camera shops. I provides the proper shade of gray needed by most built-in and hand-held light meters, to give the correct exposure. While professional photographers may intuitively know the correct exposure by the amount of sun o

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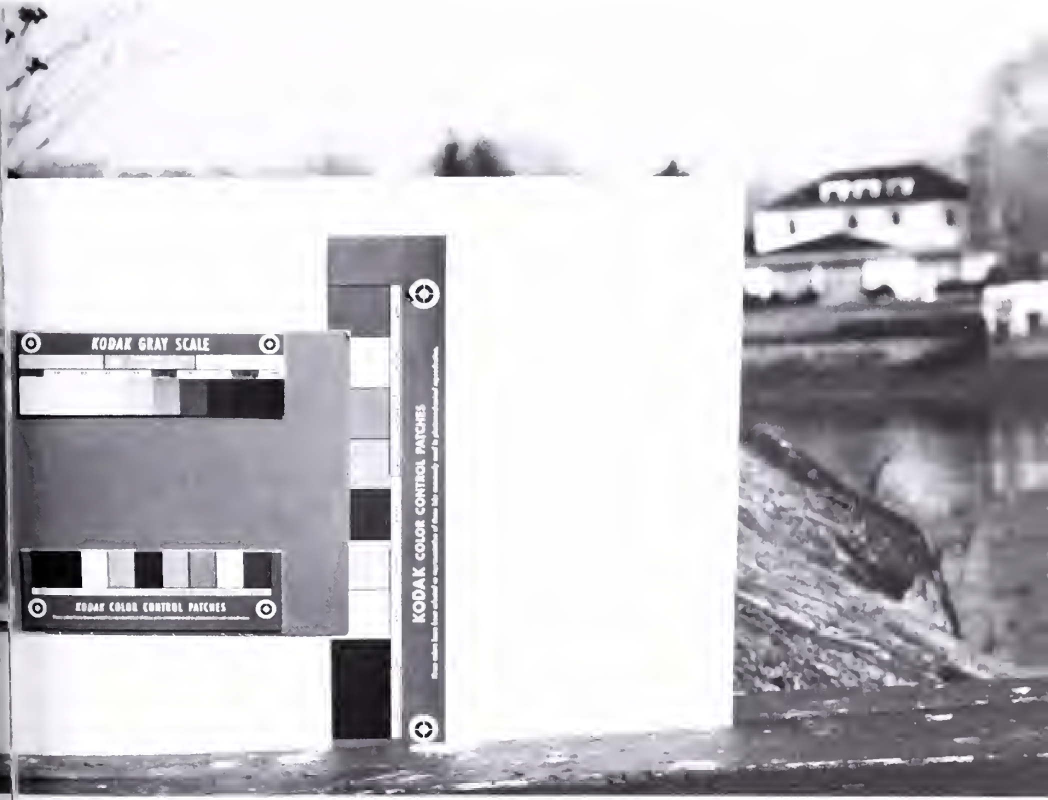
Muriel and Arthur Orans, award-winning horticultural photographers based in Oregon, hav supplied photos to nursery, agricultural, an media clients since 1956. Arthur passed away i April, 1989. Muriel continues the business.



Color check cards and a photo gray scale shown here on a Kodak gray card at the left, are useful tools for testing film and equipment.

Photo by Charles Marden Fitch

shade on their faces, remember that they have had years of experience. Use the meter reading indicated by the gray card. Test and record each exposure. These notes will help you recognize your own likes and dislikes in color saturation, reduction or extenuation of highlights, or contrasts. You will create your own aesthetically pleasing style.

Plants are the most difficult of all subjects to meter for the right exposure because of the limiting characteristics of the film. Fortunately color negative film for prints is quite forgiving as to exposure latitude.

In contrast color slide films were not formulated to record the entire scale from black to white. They can reproduce a good part of it, but not all. For example, dark greens might as well be considered black. It is up to the photographer to decide which part of the gray scale should be emphasized. Home gardeners who want to understand the gray scale better, can purchase "The Exposure" by Ansel Adams.

Sunlight

1. Time of day and latitude makes a big difference in the final color of the flower in the photograph — especially in the near whites!
   a. Morning and evening sunlight has a very warming effect as the sun is near the horizon.
   b. Outdoor film is color balanced for mid-day exposure.
2. Your orientation to the sun makes a big difference in the final effect, which you can plan for by observing that:
   a. Front lighting (coming from behind you) gives you the least amount of shadow and the greatest amount of color; however, the photograph has the least amount of apparent depth.
   b. Back lighting (you are facing the sun) produces vibrant colors and dramatic pictures because of the deep shadows, but the film does not have the ability to produce information that your eye sees in the shadows; so you will get a lot less than what you see.
   c. Side lighting (more toward front lighting rather than back lighting) is ideal — especially when using a reflective white card to add light into the shadows.

Shady or Overcast Conditions

1. These are the ideal conditions for photographing whites and pastels. Remember that in many petaled/double white flowers, i.e. clematis, shasta daisies, asters, the top petals will be the lightest colored — whitest, as each subsequent petal is inherently shadowed and will appear "grayer".

Filters

We consistently use a circular (versus linear) rotating polarizing filter to remove reflections. We use just a skylight filter when it is overcast or late in the evening. Reflections then are much less apparent.

Rotating polarizers allow photographers to get as much color saturation as they want by looking in the viewfinder and rotating the filter. A polarizer removes the hot spots, specular reflections that naturally disturb the photographer and view. Most 35-millimeter cameras with through-the-lens metering take into account the reduction in light caused by placing the polarizer in front of the lens. Green foliage can be rendered green, rather than white or washed out, if you use the polarizer.

Motion and Depth of Field Control

To achieve maximum depth of focus you mus stop down the aperture and use a slow exposure. This creates motion problems with both the camera and the subject.

Solutions

To reduce camera motion, use a tripod in combination with any or all of the following: a cable shutter release, b) locking up the camera mirror, c) utilizing the camera's self time

d) increase shutter speed to the inverse of the focal length, i.e.: use 1/100 sec for a 100mm lens.

Subject motion occurs with the slightest puff of breeze, or in the constant winds that blow in some areas of the country. Plant structure and form come into play. Ways to control subject motion include creating wind blinds by using your body to shield plants, or constructing plywood barriers. Remember not to cast unwanted shadows on your subject. The use of plant stakes, c-clamps, pinch clamps and binder's twine painted dark green can be advantageous to perk-up shasta daisies, rudbeckia and other fragile plants. Insertion of floral wire through the back of the plant stems will also control motion.

Sacrificing depth of focus for motion control through increased shutter speed may be a necessity in areas where wind speeds exceed five to seven miles per hour.

Composition & Aesthetics

Beauty is in the eye of the beholder. And a decently composed illustration is what you want. Look at the photographs in garden books and mail-order nursery catalogs. Find what pleases you and go out with camera in hand and take pictures. You may want outside analysis of your photographs. Join a camera club in your area; members share their expertise.

Here are three photographs taken under varying conditions with Kodachrome 64 and exposure taken from Kodak gray card.

Perennial border planted with Pacific hybrids.

1. This was taken with a 35mm lens, with no filter, during a light rain. Meter reading 1/30th sec at F6.3. Rather flat lighting with depth created by color layering.

2. Hill of perennial impatiens, taken in open sunlight again with 35mm lens with polarizer reducing reflection. Exposure at 1/100 sec at F11. Depth created by both camera angle and contrast of color up the hill.

3. Astilbe, taken with 50mm lens with UVA filter in open haze with a great deal of ground moisture. The texture and color are paramount; exposure 1/30th sec at F11. Notice the ability to separate the subject from its background.
(See color insert following page 32.)

To achieve a good technique, take notes. Write down your exposure time and aperture, time of day, atmospheric conditions, subject and comments. Review your pictures with your notes in hand.

SPECIAL EFFECTS

Charles Marden Fitch

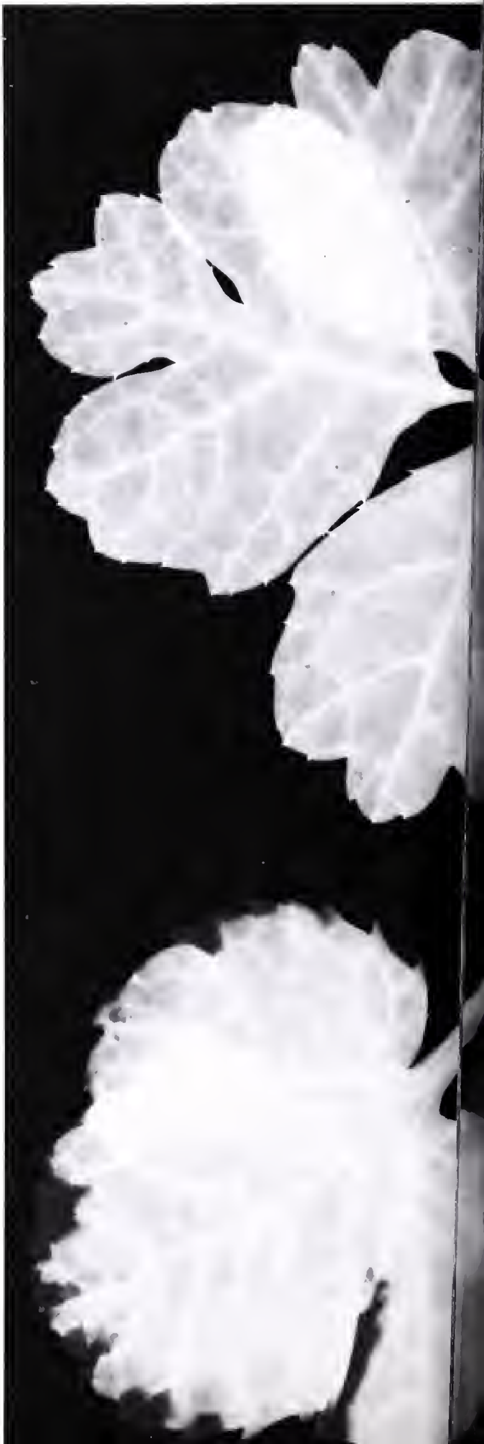
The use of special photographic techniques can result in visual variations of a subject. Some of these techniques are almost routine, such as using a green filter in black and white photography so foliage appears a lighter shade of gray. Another effect, using a polarizing filter to get deep blue skies on color film, is a favorite with experienced landscape photographers.

Filters are made of glass or plastic and fit in front of camera lenses. *Fog, soft, diffuser, mist* and similar descriptive names are devices used to render photographs less sharp. My favorite is called "Soft #1" by Nikon. It produces a gentle softening effect, mainly by making flare around reflections and lighter areas of the image.

The "Soft #1" filter creates the same sort of effect with any iris opening. Diffusers that have etched lines or sheets of mesh between glass differ in the effect they produce, according to the iris opening used.

The best way to learn about softening filters is to read the folders that accompany them, then take photographs at various iris openings.

Prisms held in front of the lens produce many different patterns. To avoid showing pre-



This photogram shows various Polyscias *foliage at actual size. Photograms effectively show intricate foliage such as that of ferns and contrasting shapes. Make by placing fresh leaves under clean glass in tight contact with polycontrast printing paper in a darkroom. Longer exposure makes leaf outlines darker while less exposure renders them lighter. White areas where leaves overlapped received the least exposure.*

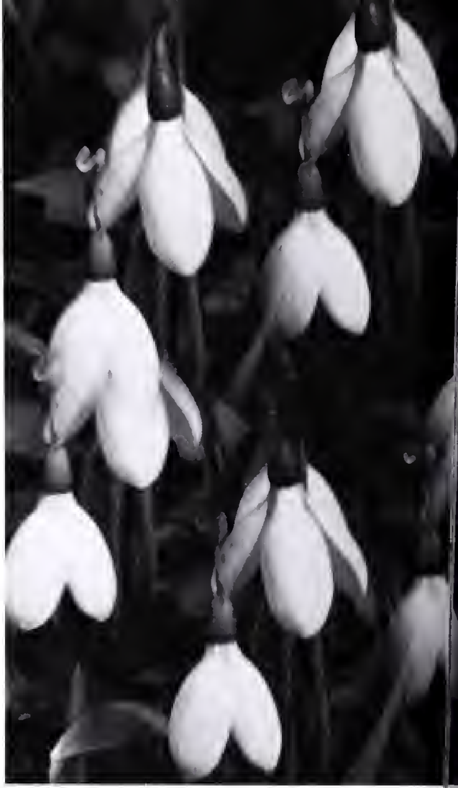
Using a macro lens and a 35mm Nikon camera and shooting at a low angle, allows the photographer to capture snowdrops, Galanthus elwesii.

cise lines where prism facets occur, use a wide to moderate iris opening. I like the prism that shows a clear image in the center, then repeats the subject as an overlapping image three or four times around the outside.

Some filters are made with two sections, one clear and the other tinted. A blue tint can be rotated so a dull sky takes on more color. Several filter firms offer booklets that illustrate the effects possible with various colors.

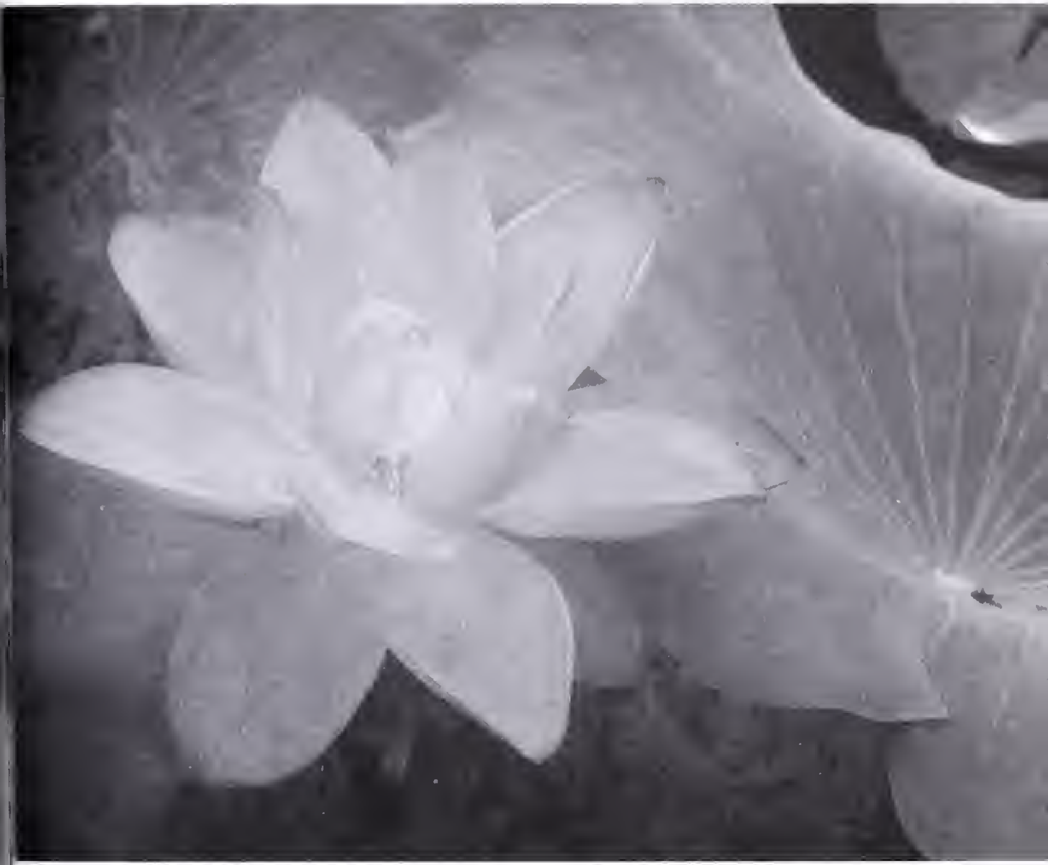
Aside from using filters to get special color effects you can experiment with mismatches of film to light source. If you want to create a moody blue in a misty spring landscape use tungsten balance film, such as Ektachrome-160, in daylight. The resulting slides will all be blue-tinted. The reverse occurs if

Color photographs can be used to decorate tee shirts. Here is a photograph of a Phalaenopsis *orchid and as the photo appears used on a tee shirt.*



A special effect is produced by adding a screw-glass prism in front of the lens—three snowdr are turned into a clump.

Right: *The original of this photograph was in color. This effect was produced by printing the original Kodachrome on black/white enlargin paper. The subjects:* Brassia caudata x B. gireoudiana.



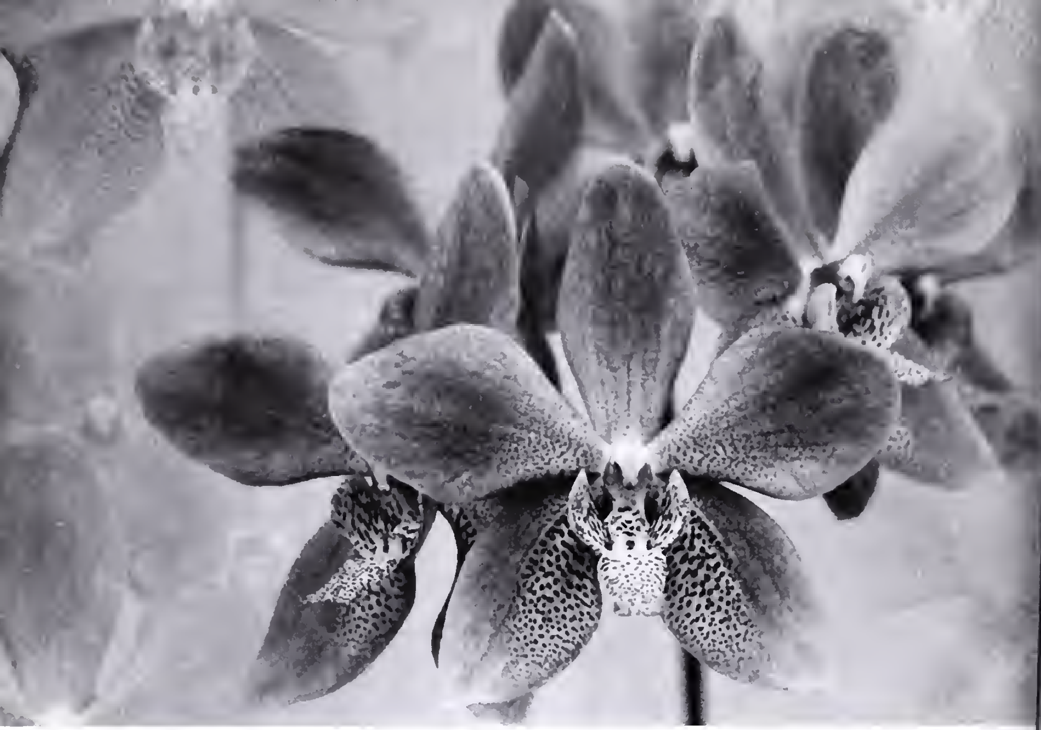
fogged lens turns this lotus flower (Nelumbo
ıcifera) *into an impressionistic portrait. To*
hieve similar results exhale on the front lens
ement or filter, then take the photo before all
oisture evaporates. Compare this misty por-
it with the clear lens vertical view.

mpare this sharp portrait of a lotus with the
mantic misty view taken through a fogged
ns.

you use daylight balanced color film under tungsten lamps. For example, a red rose photographed on Kodachrome-25 by the light of a tungsten lamp will be an abnormally rich red.

Versatile cameras often permit a precise double exposure. A good use of the double exposure effect would be to show a profile and a front view of a single flower on one frame of film. For effective double exposures use a black background. Place the subject in a different part of the frame for each exposure, unless you want an overlap.

Some special effects are best done in a photographic darkroom because they require printing and developing with light-sensitive papers. Photograms show interesting plant parts in a reverse image. Since photograms are made by placing flowers, leaves or seeds in direct contact with photographic printing



A clear glass prism produces fantasy images of Renanthopsis *Fiery Gem.*

An 8mm fisheye lens produces an unusual effe
This lens captures the sky, bamboo, water and
ground in this Singapore garden.

Paphiopedilum Niobe *photographed against si*
ver mylar produces a reflection and an unusu
effect.

paper they show the plant parts in actual size.

A variation in photograms involves printing a standard negative on to photographic paper in combination with actual objects on the paper during exposure. For example, a view of a fern clump in the garden might be printed in the center while actual fronds surround the central image.

A zoom lens can help create some special effects. Put the camera on a tripod, use a slow exposure of one or two seconds during which you zoom in or out. Interesting blurs result around the subject. This effect looks best in color. Combine the zoom effect with flash to get even greater variations or use multiple exposures on the same frame of film with a zoom move between each.

When the original color slide is projected by an enlarger on to black and white printing paper a dramatic reverse image is produced that looks like a new black orchid! Many of these special effects are appropriate to illustrate creative writing or as fantasy prints for display.

A perspective control lens, here on a 35mm SLR, permits photographing tall trees and building/landscape combinations without tilting effects. When a camera is tilted to capture a tall subject, the object appears distorted. The perspective control lens shifts so tall subjects can be shown while the camera remains parallel to the subject thus avoiding converging vertical lines.

A red and yellow miniature rose covered wit dewdrops was photographed on Kodachrome film. The slide was then printed on standard black/white enlarging paper.

Sources of Equipment and Information

B & H Photo
119 West 17th St.
NY, NY 10011
General discount photo store with full line of cameras, lenses, cases, tripods, films, professional supplies. Free price list.

Bogen Photo Corp.
17-20 Willow St., P.O. Box 712
Fair Lawn, NJ 07410-0712
Tripods and background supports. Free folders.

Calumet Photographic
890 Supreme Drive
Bensenville, IL 60106
Full catalog of cameras, lenses, flash units, cases, darkroom supplies and film.

Canon U.S.A.
One Canon Plaza
Lake Success, NY 11042
Canon cameras and lenses. Free folders.

Chimera Photo Lighting
1812 Valtec Lane
Boulder, CO 80301
Diffusion light banks. Free catalog.

Fuji Photo Film U.S.A.
555 Taxter Rd.
Elmsford, NY 10523
Film and cameras. Free folders.

GMI Photographic Inc.
1776 New Highway
Farmingdale, NY 11735
Importer for Cullmann tripods, various cases, and Bronica medium-format cameras. Free folders.

Ken Hansen
920 Broadway
NY, NY 10010
Cameras, lenses, lighting equipment. Professional lighting division.

Victor Hasselblad
10 Madison Rd.
Fairfield, NJ 07006
Hasselblad medium-format cameras and lenses. Free folders.

Eastman Kodak Co.
343 State St.
Rochester, NY 14650
Film, cameras, darkroom supplies, books. Free folders and advice.

Lepp & Associates
P.O. Box 6240
Los Osos, CA 93412
Macro photography accessories and other equipment designed for nature photographers. Free catalog.

Light Impressions
439 Monroe Ave.
Rochester, NY 14607
Books, print and slide storage supplies. Free catalog.

Lightware, Inc.
1541 Platte St.
Denver, CO 80202
Padded professional cases for cameras and lighting equipment.

Lowel-Light Mfg., Inc.
140 58th St.
Brooklyn, NY 11220
Reflectors, lights, stands, related equipmen

Mamiya America Corp.
8 Westchester Plaza
Elmsford, NY 10523
Medium-format Mamiya cameras and lense
Free folders.

Minolta Corp.
101 Williams Drive
Ramsey, NJ 07446
Minolta cameras and lenses. Free folders.

Nikon Inc.
19601 Hamilton Ave.
Torrance, CA 90502-1309
Nikon cameras, lenses, flash units, filters, and related accessories. Free folders describe products.

Olympus Camera Co.
Woodbury, NY 11797
Olympus cameras, lenses, system accessories. Free folders.

Photek
909 Bridgeport Ave.
Shelton, CT 06484
Background materials and photo umbrellas.

Polaroid Corp.
575 Technology Sq.
Cambridge MA 02139
Instant films, cameras. Free folders.

Porter's Camera Store
Box 628
Cedar Falls, IA 50613
General mail-order catalog of photo equipment, film and darkroom supplies, many accessories. Free catalog.

Quantum Instruments, Inc.
1075 Stewart Ave.
Garden City, NY 11530
Flash battery packs, wireless slaves.

Savage Universal Corp.
350 Third Ave.
NY, NY 10017
Savage seamless background paper. Free color chart.

ekonic R.T.S.
0-11 Burt Drive
Deer Park, NY 11729
ekonic meters to measure flash and mbient light. Free folders.

The Setshop
3 West 20th St.
NY, NY 10011
Supplies for studio photography. Backgrounds, supports, gels and diffusion materials.

Tamrac, Inc.
6709 Independence Ave.
Canoga Park, CA 91303
More than 40 different camera bags. Free catalog.

Tekno-Balcar
15 E. 30th St.
NY, NY 10016
Balcar professional studio flash systems and portable flash, stands, reflectors. Branch offices in Chicago, Los Angeles and Ontario.

Vivitar Corp.
9350 DeSoto Ave.
Chatsworth, CA 91313
Lenses, flash units, cameras. Free folders.

Wein Products, Inc.
115 West 25th St.
Los Angeles, CA 90007
Infrared flash triggers, slave units, cords.

Reading List

For more information about photographing gardens and plants consult these publications:

Orchid Photography (American Orchid Society handbook)
The Rodale Book of GARDEN PHOTOGRAPHY by Charles Marden Fitch (Amphoto/Watson-Guptill, NY)
Pro Techniques of Landscape Photography by Josef Muench (HP Books, Tucson AZ)
Close-Up Photography (Eastman Kodak Pub. K-22)
Landscape Photography (Eastman Kodak Pub. AC-97)

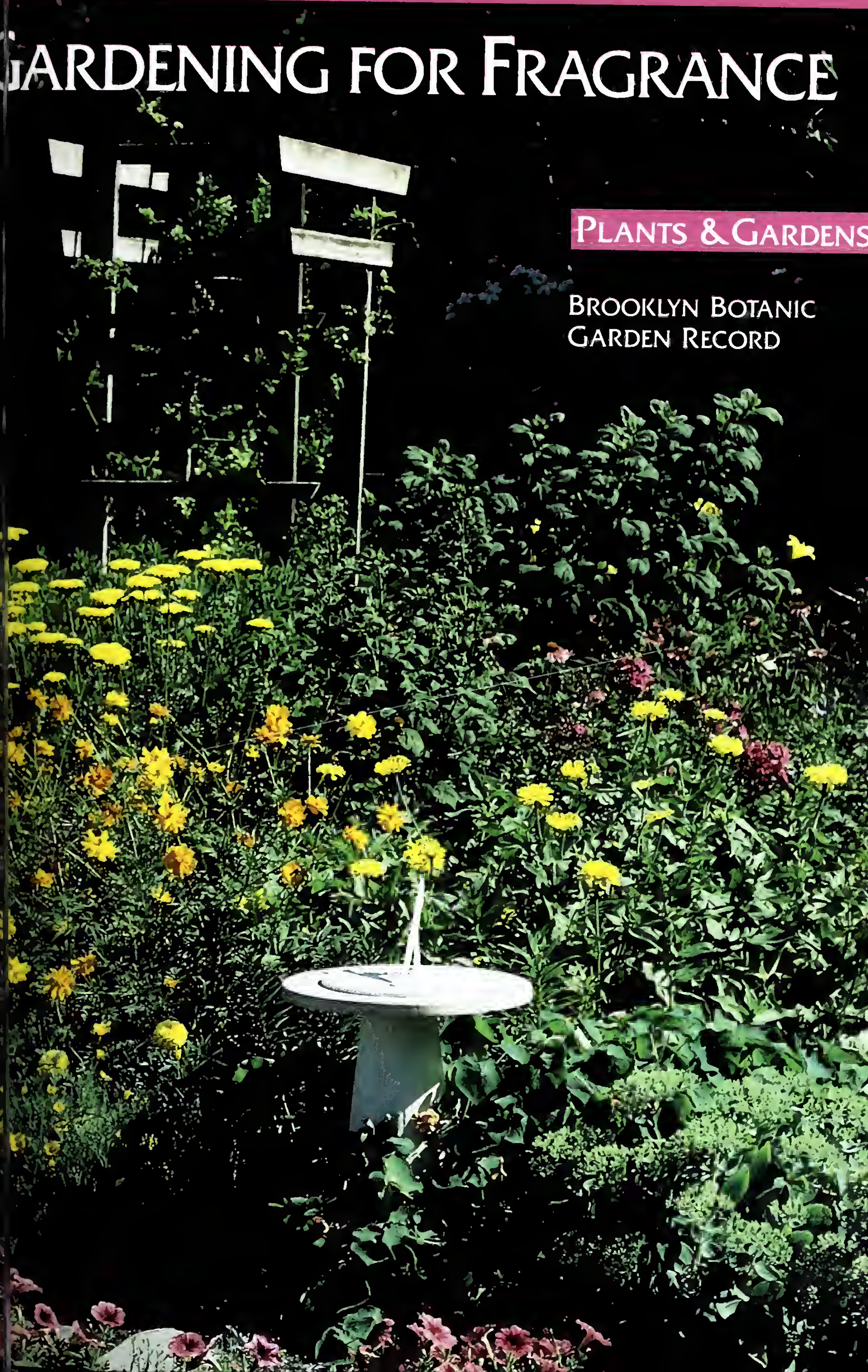
Notes

Practical handbooks to share the Brooklyn Botanic Garden's 75 years of excellence in horticulture, education and community service.

GARDENING FOR FRAGRANCE

PLANTS & GARDENS

BROOKLYN BOTANIC
GARDEN RECORD



PLANTS & GARDENS

BROOKLYN BOTANIC GARDEN RECORD

Gardening for Fragrance

1989

Brooklyn Botanic Garden

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PLANTS & GARDENS
BROOKLYN BOTANIC GARDEN RECORD

Gardening for Fragrance

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foreword

According to legend, when God banished Adam from Paradise He allowed him to take away three plants: wheat, the principal food; the date, the most delicious fruit; and myrtle, the queen of scented flowers. From earliest times plants have been esteemed as much for their fragrance as for their practical value.

Today, Adam could sniff a perfumed advertisement in a glossy magazine or breathe air scented by an electric scent dispenser, but, he might prefer to cultivate his own fragrances. And the scented plants in his garden would no doubt make him homesick for the Garden of Eden, for smell is the sense most closely tied to memory. Perhaps one of the reasons why fragrant plants are loved and cultivated by gardeners everywhere is that they so insistently bring back the joys of childhood. Some of my most cherished memories of my father's garden are the delicate smell of rainbow-colored sweet peas, the tangy odor of tomato plants warmed by the sun, and the pungent aroma of zinnias, marigolds and nasturtiums filling the house when all the late-blooming flowers had been gathered before the first frost.

Throughout history plant scents have delighted and served humankind. The ancient Greeks and Romans wove sweet-smelling herbs such as rosemary, oregano, mint, bay, and thyme into garlands, and they also strewed these herbs on their floors so that the lovely fragrances would dispel bad odors and cheer the heart. For deodorants the Greeks rubbed mint on their arms and wore necklaces made of pomanders of rose petals, Indian nard, and myrrh. In the Middle Ages mint and rosemary were used to sweeten the breath; lavender, rose petals, and the roots of valerian were laid away with clothes to perfume them; and in the heat of the summer, bunches of sweet woodruff were hung in houses to freshen the air. Strong-smelling herbs like wormwood, southernwood, tansy and rosemary have long served as moth repellants; and rue, with its acrid smell, was once strewn about as a disinfectant, particularly in English law courts, where it was thought to protect the judges from jail fever. The Welsh in the 6th century are said to have worn leeks in their caps so that their stench would repel the invading Anglo-Saxons. The odors of some plants have been considered harmful: the heavy, sweet scent of the narcissus, for example, was once reputed to cause lethargy and madness. The scent of violets, however, was thought to be salubrious; according to a medieval health manual one only had to smell these lovely flowers to feel well.

Today we understand a great deal more about the botanical and chemical aspects of fragrance than did our ancestors. But modern scientific developments have not been entirely positive. While chemists can concoct all kinds of artificial scents in test tubes, hybridizers have succeeded in breeding the fragrances out of many flowers that were once treasured as much for their smell as for their appearance. There is renewed interest in natural fragrances, however, as is evidenced by the numerous fragrance gardens that have sprung up around the country and the many books now on the market devoted to scented plants. It is hoped that the articles in this handbook will stimulate further enthusiasm and encourage gardeners everywhere to discover the pleasures of gardening for fragrance.

Tania Bayard
Guest Editor

Roses and rose petals collected to make potpourri create a tapestry of colors and textures and a rich blend of fragrances.

Tania Bayard is a free-lance writer, lecturer, horticulturist and art historian. She has written several books and is in the process of writing two more. This is the first time she has guest edited for BBG. She divides her time between Manhattan and Vermont.

Biological Aspects of Scent

Doris Stone

Flowering plants are the most versatile chemical factories on earth. Not only do they synthesize food for themselves and the entire animal kingdom, but they also produce a whole range of other compounds, formerly thought to be mere waste products of this intense chemical activity. Only in the last few decades has it become apparent that these so-called waste products have genuine survival value. Thus odors attract pollinators or repel predators, while unpleasant-tasting substances, often downright poisons, prevent plants from being grazed to death. In other words, during the course of evolution the development of co-relationships between plants and animals — including interdependence — became the key to biological success. Here we are concerned only with plant odors, but other substances such as nectar, pollen, pigments and poisonous alkaloids were part of the story.

The process of coevolution began some 100 to 150 million years ago. The scents of flowering plants became geared to the animals evolving at the same time, namely the mammals and the insects. The formula for success: plant odors that activate animal olfactory organs and animal behavior programmed to respond to these odors, either positively or negatively.

Flowering plant odors are mainly associated with sexual reproduction, and the necessary prelude to seed production is pollination of the flower. Enlisting animal help with pollination demanded plant lures. Food is the ultimate lure, but its presence had to be advertised. Scent, color, and flower form proved to be the most efficacious method. Modifications of plant and animal morphology evolved "in tandem," ensuring a unique kind of mutualism, whereby pollination is assured by payment of rewards.

The production of odors is expensive to the plant — indicating that it is needed to ensure survival. For instance, within the inflorescences of the arums, both temperate and tropical, starch is consumed and the respiration rate increases with the subsequent generation of heat. Volatile substances (evil-smelling to our noses) are emitted, attracting to the plant hordes of pollinating flies. Familiar examples of such flowers are the two skunk cabbage species of the eastern and western states.

What is the nature of these floral scents? All are volatile organic compounds and most are "essential oils" in that their essences can be extracted by steam distillation or with ether. Chemically, they are terpenes — thus geraniol from the rose is a monoterpene and β-ionone from the violet is a sesquiterpene. There are also aromatic volatiles, such as vanillin from many orchids. Some are amines and other unpleasant-smelling compounds — at least to us and to bees — but more of this later. Many hundreds of these substances are known and indeed any particular flower scent may consist of around a hundred of these constituents. No wonder floral scents are individual and distinctive to a particular species. Think of the complex smell of gardenia or of lavender.

The fragrance is produced by special parts of the petals, which bear secretory glands (see diagram of the cross-section of a petal as seen under the microscope). In fact, it has been recently shown that not only honey guides (more correctly called nectar guides) but scent guides also direct insects to the food source within the flower. Usually, the location

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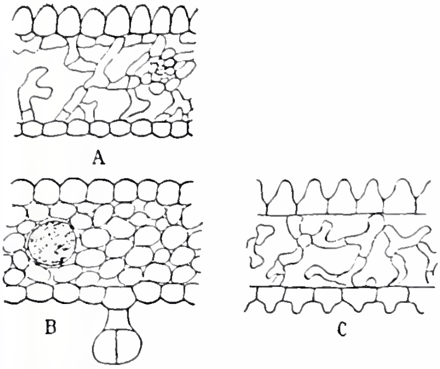
Doris Stone, botanist and horticulturist, former Director of Education at the Brooklyn Botanic Garden, is the author of Great Public Gardens of the Eastern United States *(Pantheon, 1982) and* The Lives of Plants *(Scribner's, 1983).*



Cross sections of petals: A, Amelanchier laevis; *B,* Lysimachia nummularia, *showing glandular hair and secretory chamber; C,* Pinguicula vulgaris.

of both types of guide coincide, reinforcing one another. In young horsechestnut blossoms, for instance, the nectar guides are yellow and scented, but with age they turn crimson, lose their scent, and stop nectar production. (Bee color vision is not as sensitive to crimson as to yellow.) Because of these changes bees do not waste energy on flowers already pollinated.

Timing of scent-production is economical as well as an adaptation to the clientèle. Blooms catering to night-flying animals, such as moths and bats, smell only at night, while flowers pollinated by diurnal insects give off their strongest perfume at noon. In general, scent production ceases after pollination.

Among flowers that attract night-fliers are honeysuckle, gardenia, stock, tobacco, tuberose and evening primrose. One tropical plant of the tobacco family, *Cestrum nocturnum,* produces such a strong "heady" odor that it cannot be grown near the house. Its Sudanese name means 'night whore' ("unobtrusive in the daytime, agreeable at night, and disgusting in the morning!").[*1]

It appears that in the early years of floral evolution scent rather than color was the primary attractant. Pollinators were beetles — then at the peak of insect evolution — and though they have good "noses," their color vision is poor. Today's primitive flowers — magnolias, water lilies, peonies and members of the custard apple family Annonaceae — are strongly scented and still beetle-pollinated.[*2] Some offer only pollen — beetles cannot cope with nectar. Subsequently, as bees, butterflies and moths began to appear, so did new floral forms in the "tandem" evolution already mentioned.

It is indeed fortunate for us that odors attractive to most pollinators are also attractive to us, or else the world would be a less pleasant place to live in. But for the insect, floral scents elicit a foraging response, their sources to be tracked down. The olfactory sense of honeybees has been studied more intensively than that of other insects. In its acuity and its preferences it is much like our own. Thus the thresholds for detecting scent are about the same in the two species, around 1.9 x 10^9 to 4.5 x 10^{11} molecules per cm^3. Contrast this with the incredible sensitivity of the dog's nose — 6,000 mols. per cm^3 of butyric acid (hence the success of bloodhounds, this acid being found in human sweat).

Bees can readily be trained to fly to a food source, if it is "labeled" with a particular scent, which has to be pleasant and flowery. They cannot be trained to an unpleasant smell, such as that of rotting meat. The food source is usually sugar water, which lacks any smell of its own. After the training period these guinea pig bees are now let loose in an area where there are twenty-four pleasant and flowery scents. Invariably they fly to the scent they have been trained to, indicating a high degree of olfactory discrimination. If the bees are trained to a mixture of two flowery scents and later tested with the separate components, they will fly to both. But the most extraordinary finding was that bees can be trained to a particular *sequence* of three scents. In a tube baited with sugar water the scent at the mouth was rosemary, followed by thyme and lastly, fennel. After a training period the bees were presented with four similar tubes. Only one was identical to the original tube. The other three held the *same* scents but in different sequences. Of the hundred or so bees in the experiment, approximately 80 chose the tube

[1*] *Reference — Barth — see Bibliography*

[2*] *When I was plant breeder of magnolias at BBG these beetles, no more than 5mm long, were my competitors!*

with the "correct" sequence. An astonishing result — involving not only olfactory discrimination, but memory of space/time experiences as well.

Within the hive the scents of flowers currently in bloom are given off by the bodies of the returning collectors. This information, together with the location of the flowers (conveyed by the famous "waggle dance" of these same collectors*[3]), allows the neophyte worker bees to embark on their "maiden" trips unescorted. Once outside the hive, guided by the sun, they fly towards the target. From a distance flower color attracts, but then, as they turn into the wind, it is the scent that finally brings them to the food source. Nectar and scent guides lead them and/or their probosces past the stamens and pistil to the nectar awaiting them in the floral depths.

For decades, if not centuries, naturalists have been impressed with the so-called flower constancy of bees — the fact that within a particular area bees stick with the same species of flower until all individuals have been visited. Obviously, with limited time and energy it is much more efficient to repeat the same maneuvers on the same type of flower over and over again. Once the idiosyncrasies of a type of flower, say a foxglove or an oregano, have been learned, foraging is greatly speeded up. And, from the plants' point of view, flower constancy is essential. Seed set can only come about if pollen of the same species is deposited on the female organ or pistil. Were bees to dart about from one type of flower to another they would be failures as pollinators.

Only recently has it been proved that the bee identifies the particular species, not by its shape nor its color, but by its distinctive scent. After all, if a hundred or so ingredients can go into the manufacture of a particular floral perfume, and given the bee's olfactory acuity, mistakes are unlikely. In fact, of the various signals bees associate with flowers, scent is learned more rapidly than either color or form and is probably an innate fixture in the nervous system. To sum up, flower constancy is a nice example of mutualism on the ecological scene.

Photos by Doris Stone

Cabbage white butterfly hovering over a cabbage. The leaves have holes in them indicating the presence of caterpillars as well.

Zoologists, involved in the study of pollination ecology, have in recent years studied the bee's olfactory organ. As most of us would guess, its "nose" comprises the two antennae that stick out from its head. Microscopic (both light and electron) examinations have revealed that each antenna is dotted with about 6,000 oval, concave pore plates or sensilla, which are connected with special sense cells. Approximately 3,500 tiny pores on each pore plate allow air to diffuse through, and, if scent-laden, the air excites first the sense cells and then the brain. The two antennae can detect odors separately — an advantage the bee has over us. This is no doubt related to the important role of smell in its locomotion. The antennae of flies, beetles, butterflies and moths play a similar role in detecting smells. Flies, however, tend to be attracted to what we would term unpleasant odors, which brings us to the topic of the stinking flowers.

Mentioned earlier was the family Araceae, whose tubular inflorescences give off volatile amines, smelling of stinking fish, feces or rotting flesh. In the plant world this is deceptive advertising. Expecting a rotting organic medium for egg-laying, flies become entrapped in the floral tube, and willy-nilly effect pollination as they gorge pollen or nectar (or lay eggs) during their temporary incarceration. Death of floral tissues allows their escape; undaunted and pollen-dusted they fly off to the next arum to be similarly fooled.

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[3]* *First discovered by Karl von Frisch — see B. J. D. Meeuse* Pollination, *Carolina Biology Reader #33.*

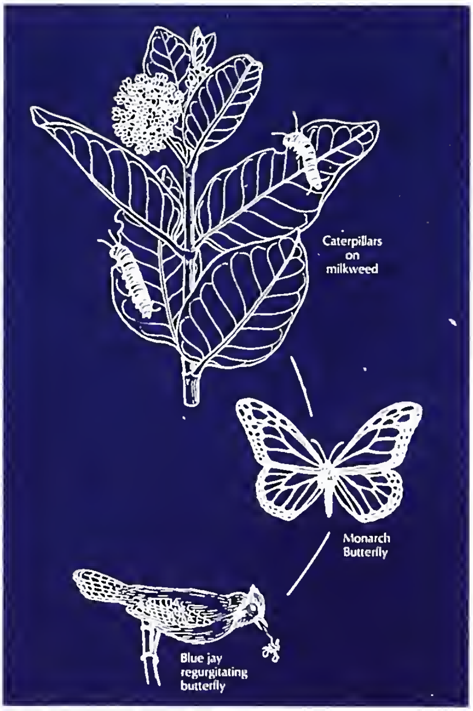
The putrid smell of Jack-in-the-pulpit or skunk cabbage is nothing compared to that of some exotic arums. Thus the Sardinian arum *Helicodiceros muscivorus,* only 15 inches high, releases a stench in quantity and quality equal to that emitted by the corpse of a sheep. The Indonesian *Amorphophallus titanum* with an inflorescence eight feet high, can emit such an overpowering stink that squeamish bystanders have been known to faint!

Color also plays a part in luring flies and beetles to these evil-smelling flowers — their spathes or petals are often the maroon color of decaying meat. Still, the arums do reward the insects with some kind of sustenance; but not so the members of the *Stapelia* genus of African succulents. Lured to the starfish-shaped flowers by color and the odor of bad fish, the flies go unrewarded. Larvae that hatch from the eggs foolishly laid on the maroon petals will face starvation. Nothing mutualistic about this — the flies are duped to serve the plants' ends.

Another form of plant exploitation is even more bizarre. It occurs in the genus *Ophrys,* comprising small orchids mainly confined to the Mediterranean region, but also occurring worldwide. Each *Ophrys* flower looks like a female insect sitting on a flower — a fly, a spider or many species of bee orchids — the name indicating the type of insect simulated. This is the visual lure, but the olfactory one is even more powerful, as was proved by a botanist who hid one flower in his parked car with open windows! It is the sexual pheromone (or a very good chemical mimic of it) of the female and it is *manufactured by the orchid.* In spring the males hatch before the females, so these deceiving flowers have no competition from the "real thing." Pollination is accomplished by a pseudocopulation on the flower. Then unsatisfied (as one might guess) the pollen-bearing male goes off to "mate" with another *Ophrys.* No nectar is offered and the pollen is inaccessible as food as it is contained in structures called pollinia, which stick to the insect's body during the encounter.

I once found a wild bee orchid on the English Downs. Its color, markings, hairiness and shape were quite remarkable. Yet this orchid is self pollinated; it is beyond the range of the solitary bee or wasp that originally pollinated it (its seeds having been transported by some means from the Mediterranean). This, of course, is the danger of depending on just one type of pollinator. Extinction was avoided in this case, but not all flowers are capable of self pollination.

Another strange relationship between orchids and male euglossine bees occurs in the tropical forests of central and South America. This is one of mutualism in that the bees collect perfume made by the flower and in so doing pollinate them. Called "magnificent bees" in German because of their resplendent blue/green/gold colors, they are related to bumble bees, except that they have exceptionally long tongues. During their solitary existence they feed on the nectar of butterfly



The above illustrations show the exploitation of milkweed (Asclepias *sp*) *by the monarch butterfly.*

flowers, but just before courtship they are attracted to certain orchids by their powerful perfumes (each species of bee seems to have its own orchid preference).

The scent is collected from the flower and stored in special spongy "perfume flasks," located on the tibiae of the hind legs. One species of bee can store 60 mm^3 of the odor substance, the main ingredient of which is a eucalyptus essential oil. No food is available. Often the scent is intoxicating, pollination being achieved as the bees flounder about within the flower.

Male bees with full perfume flasks now congregate in swarms or "leks," ventilate themselves with fluttering wings, as if attempting to waft the scent around. For some reason the females are attracted to the swarms and mating occurs. It cannot be just the perfume because female bees do not visit the orchids, which are exclusive male "clubs." The peculiar sex habits of these orchid bees was elucidated only some fifteen years ago by C. H. Dodgson and S. Vogel.

Alluring odors are mainly the province of flowers but there is at least one carnivorous plant that, by means of the mousy smell of the alkaloid coniine, attracts flies. It is *Sarracenia flava,* the American pitcher plant. Not only does the smell lure the insects into the trap, but the poison paralyses them, making capture and digestion that much easier. (Also present in the leaves of hemlock *Conium maculatum,* it was the poison given to Socrates.)

Currently, with the popularity of low-salt diets, back-to-nature recipes and remedies, herbs, and especially culinary ones, are highly fashionable. What exactly is the biological purpose of all these aromatic substances, mainly essential oils, that abound in the leaf glands of mint, dill, sage, bay laurel, tarragon, chives, garlic, thyme, lovage, catnip, artemisia, scented geraniums, etc.? Little scientific research has been carried out, but from what puny evidence we have they appear to be deterrents to leaf-eating predators, especially insects. If you have a herb garden, you may have noticed how relatively free it is of insect diseases, compared with your vegetable garden.

We do know that mint deters mice (reference** below). And in 1964 T. Eisner, in nicely controlled experiments, showed that though felines regard catnip as a felicitous gift from the gods, ants find it just the reverse. Having extracted the essential oil of catnip, nepetalactone, he isolated a group of ants, using a glass rod dipped in the liquid to circumscribe a circle. The ants refused to cross this nepetalactone "moat." Moreover, if a drop of the oil is placed in the path of ants advancing upon their food, they make a wide detour to avoid it. Dr. Eisner took two corpses of cock roaches, which they readily eat, impregnated one with nepetalactone and left both close to an ant colony. Soon the uncontaminated roach was swarming with ants, while the other wa left virtually alone. Besides ants, other insect are repelled by the catnip oil, among them beetles and spittlebugs.

These insects do not, however, function a pollinators of herb flowers. An alternative view of these essential oils exists — though perhaps the two theories are not mutually exlusive. This theory holds that the scented leaves enhance the attractiveness of the usu ally inconspicuous flowers. I have noticed tha when oregano is in bloom no other flower i my garden is so popular with honeybees despite the flowers' small size and pink colo which is certainly not one of the so-called be colors. Are the oregano flowers specially ric in nectar? If so,and assuming that the worke bees have learned this fact within the hiv then the essential oils of the entire plant ma serve collectively as a compelling floral attrac tant. Testimony to the success of the pollin tion process is the number of oregan seedings that spring up all over my her garden every spring.

With few exceptions fragrance is associate with all kinds of fruits. Ripe fleshy ones a especially fragrant when bruised by falling the ground or by being jostled by foragin

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** Leaves — *Ghillean Tolmie Prance & Kjell Sandved.*

animals. Are these odors a means of attracting animals to succulent tidbits, so that the seeds get dispersed? It would seem so. Surely the essential oils present in the peel of citrus (oil of bergamot is used to scent commodities as diverse as soap, tea and perfume), the delectable smell of ripe strawberries, apricots, and plums, are not merely fortuitous? The seeds of the larger fruits are usually rejected, but those of the smaller ones are known to pass through the digestive tract unharmed. In the case of the small aromatic dry fruits of umbellifers (Apiaceae) such as anise, coriander, dill and parsley, presumably the number of seeds destroyed by chewing is offset by those lost in transit (like the acorn).

Thus throughout the whole sexual reproductive process of the flowering plants, scents play an important role in recruiting animal help.

On the other hand plant odors do not always function as attractants — many serve to stop predators in their tracks. Instead of poisoning the animal outright, they provide olfactory warnings that the herbivores immediately heed. Should an insect, for example, begin to chew the leaves of a wild cherry *(Prunus serotina, P. caroliniana)*, it will immediately detect the smell of bitter almonds — hydrocyanic acid, a lethal nerve poison. A glucose compound stored in the leaf cells breaks up on exposure to oxygen of the air, liberating the fatal gas. In the cabbage family all the leaves contain sinigrin. Again damage to the cells, allowing the entry of air, causes the substance to decompose, liberating the insecticide mustard oil. (It is interesting to note that although hydrocyanic acid is fatal to man, mustard oil is a revered condiment — in small quantities. But we have to remember that in the early days of flowering plant evolution, insects, as predators, were the greatest enemies — not our own species.) Since insects are the most adaptable of animals there are always some species of insects that develop immunity to plant poisons. Witness the cabbage white caterpillars and cabbage aphids that voraciously thrive on all brassicas and will even die without their favorite sinigrin! These are just two of the many aromatic poisons liberated by plants when attacked by hungry herbivores. Some of the old medieval names for weeds such as henbane, dogbane, cowbane, fleabane and wolfsbane indicate that such feeding deterrents are widespread — none of the above plants belong to the same family ('bane' is of course an old English word for poison).

There is no doubt that the flowering plant is a parfumerie par excellence, and though we have elucidated the roles of some of the odors emitted there are still many basic questions needing answers. Coordination of the biochemistry involved is a closed book. What, for instance, triggers the wonderful fragrance of honeysuckle at dusk on a summer's evening? The question is simple, but the complicated answer has yet to come from the relatively new science of ecological biochemistry. ❧

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THE LORE AND LURE OF PERFUME

Frank Anderson

Perfume has always been one of the grace notes of civilization. Beginning in ancient Egypt, where it was employed to enhance royal and religious ceremonies, the use of perfume soon spread into other areas of everyday life. Long before such concepts as botany and chemistry came into being, aromatic substances were widely popular, and trade routes that brought them to market had been well established. Rather than the flagons of fragrant liquids to which we are accustomed, perfumes were originally distributed in the form of incense, scented oils, resins, gums, and fragrant wood. As for flowers, although everyone took pleasure in smelling them, such enjoyment was short lived, generally confined to the place and the season that actually produced the blossoms, for no means of preserving their elusive odors existed as yet.

All of that changed, however, with the chance observation that heavily scented flowers transferred their aroma to fatty substances, such as tallow or greasy hides. In all probability some highly fragrant blossoms came into lengthy, accidental contact with solidified fats in a sequestered storage area. The result was the discovery of *enfleurage*, the technique of placing petals upon layers of

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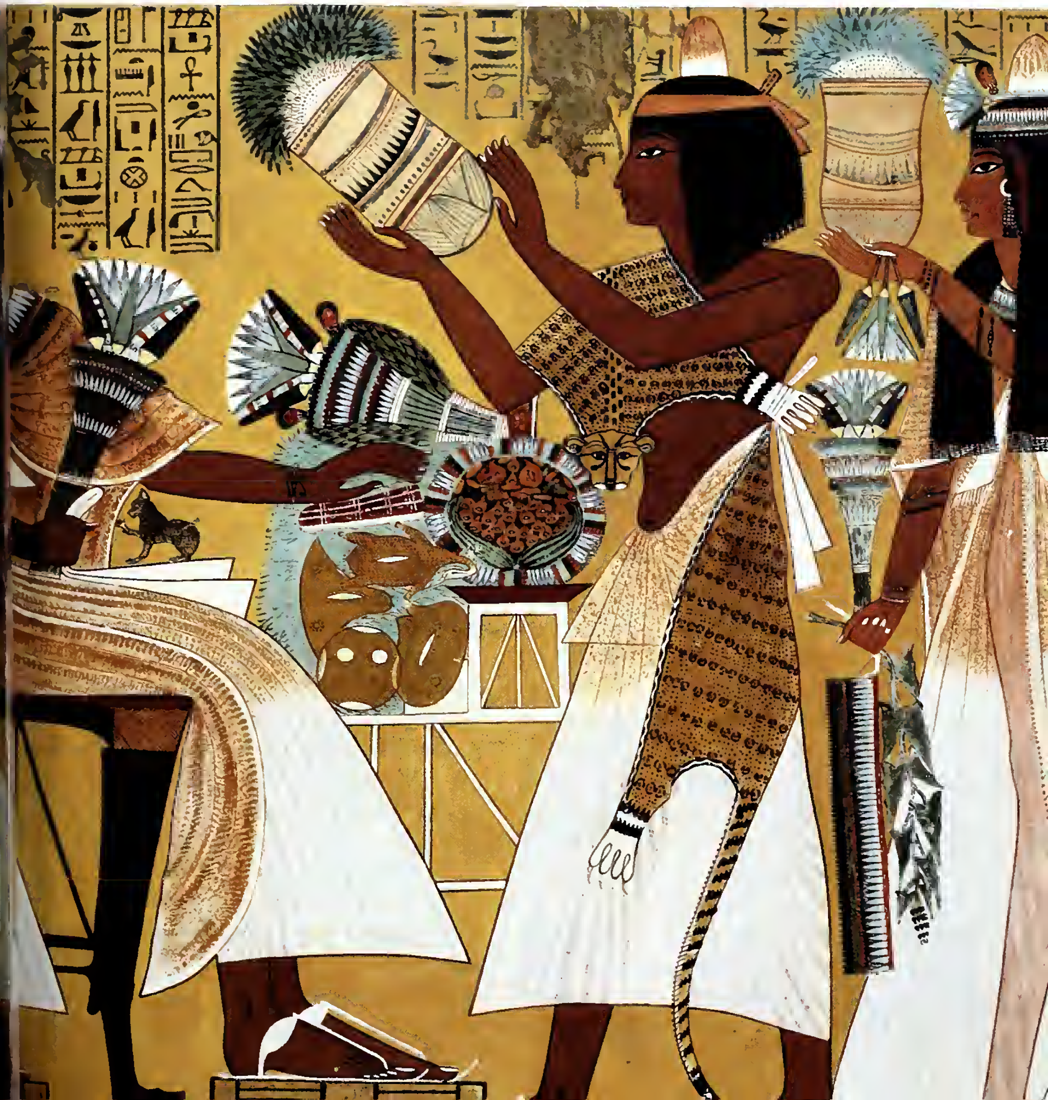
fat until their volatile oils are completely absorbed, a practice that remains in use to this day in the perfume industry.

Various combinations were tried out, once the principle was recognized, and previous experience gained in the preparation of incense, or the preservation of mummies, was fully exploited. Luckily Egypt had a rich selection of aromatic essences, and before long a torrent of unguents and pomades filled the cosmetic jars of the land. Men and women alike fell victims to the craze, and it became unthinkable to hold any private feast or ceremony without offering cones of fragrant pomade to all the household guests. The manner of use, however, was hardly to the modern taste, as the cones were perched atop the heads of the assembly, where they slowly melted and trickled down into their wigs or hair. Not only did this require the balancing skills of a juggler, but there was also apt to be a messy conclusion, once the abundance of wine and beer began to have its effect on the revellers.

Thebes, 19th Dynasty, c 1275 B.C. Ipuy and his wife receiving offerings from their children—note fragrance cones. Egyptian Expedition of The Metropolitan Museum of Art, Rogers Fund, 1930. (30.4.114)



Despite the wealth of fragrance at the Egyptians' disposal, recurring shortages of certain items interfered with some rituals. Worship of the god Amon demanded inordinate amounts of frankincense to be burned in his temples, more in fact than was obtainable by ordinary means. In 1560 B.C. Queen Hatshepsut set about rectifying that situation, and sent a small expedition to the land of Punt at the mouth of the Red Sea. There 31 *Boswellia carteri* trees were purchased and safely transported back to Egypt, thus ending the incense crisis. That also initiated the first record of botanical exploration and plant introduction, since it was depicted among the sculptures on the walls of Hatshepsut's temple at Deir el-Bahri, just west of Thebes.

The development of the craft of perfumery was by no means confined to ancient Egypt. The Babylonians, Assyrians, Greeks, Romans, and then the Arabs all made continuous contributions. Besides *enfleurage,* there were the techniques of expression, wherein essential oils were forced out by the application of pressure, just as is done in an olive mill, and also maceration. In the latter process pieces of plants are broken up and placed in heated oil or fat. Roses, violets, cassie flowers from species of acacia, and orange blossoms are usually treated in this way. Yet another method is to use solvents to extract the essential oils of the flowers — generally petroleum ether, which is later distilled off. A partially solid substance, called the *concrete,* remains, and that, in turn, is subjected to alcohol, followed by freezing or filtering to remove all of the remaining plant waxes. Finally the alcohol is eliminated, and a highly concentrated perfumed oil, the *absolute,* becomes the chief tool of the perfumer in the creation of newly blended aromas. At long last the evasiveness of scent has been brought under control, but the process does exact a price, which is why perfumes become an increasingly expensive luxury.

To combat rising costs, natural aromatics are being replaced by synthetic ones, yet there is a limit to the deceits that can be practiced on the nose. Some degree of natural material is required if the scent is to remain free of the sharper notes that are born in the chemist's flask rather than in a flower's corolla. To provide such natural aromas there must be a place where flowers can be raised and harvested, perhaps even partially processed. But it is precisely there that the perfumer's world encounters the destructive forces of economics. Raising flowers means having access to parcels of land, and in a world where food shortages are becoming acute, pleasant smells are low on the priority list. What is more, housing is as greedy for land as farming, and more and more marginal and remote areas are being placed under cultivation. Where huge tracts of land once supported the raising of flowers for seed or scent materials, the floral trades are today being brought to the edge of extinction. We must now go to such locations as Reunion Island, in the Indian Ocean, or the hinterlands of Morocco, to find enough soil to produce the necessary crops. As matters stand at present the flower growers are being driven from California, much as they were from Grasse, France, where perfume materials are still processed but no longer produced.

Over the course of centuries certain animal substances were found to be highly preservative of scent—musk, civet, and ambergris being well known examples. The musk deer of Asia was even brought to the edge of extinction by avaricious hunters who killed this rare animal simply for the sake of its scent glands, discarding all the rest of the carcass. Much the same was true of the civet cat, and the only reason that whales were not destroyed for their ambergris was because they generally voided the material at sea, and there was no certainty that they retained any useful amounts concealed within their digestive tracts. In any event, modern chemistry has provided satisfactory substitutes, fixatives that bind the volatile oils, releasing their aromatic properties very slowly over long periods of time. The procedure is roughly akin t the way in which pine needles encapsulate and gradually exude their content of fragran resin.

One plant product which has been use increasingly of late is oak moss, *mousse d* *chêne,* which is in fact a lichen. When first gathered it is seemingly odorless, but placed in storage it soon begins to develop a heavy, penetrating aroma that has the invaluable ability to blend well with other odors. The scent arises from the lichen's production of oleoresins, which not only possess a pleasing smell, but also greatly retard loss of essential oils through volatility, actually filling the function of a fixative.

Among aromatic oddities is the "odor of sanctity," which is genuine enough, although not properly classifiable as a perfume ingredient. Long thought to be the result of having led a particularly devout life, it is now known to be caused by nothing more sacrosanct than bacterial action. Bacteria, after all, do comprise a separate division of the plant kingdom, essentially the same as the flowers that bloom in the fields. Very often they accompany certain courses of illness such as diabetes or tuberculosis and profoundly affect the scent of the breath, the skin and various bodily secretions. Should the bacillus *pyocyaneus* be present the aroma of strawberries will be noticed, and since strawberries were long associated with paradise as the fruits of good deeds, it is clear how the general assumption of the odor of holiness came about. In instances where turpentine has been used to cleanse the body the smell of violets becomes pronounced, while other scents, as lily, rose, and pineapple, have also been noted.

There has been a strong connection since ancient times between health and highly aromatic substances, a connection that modern science reinforces to a considerable degree. Many of the essential oils used in perfumery possess powerful bactericidal properties. It was not entirely for nothing that pomanders and nosegays were carried and frequently sniffed in public assemblages, almost down to present times. In addition to masking obnoxious odors with pungent and pleasant ones, the essences inhaled had an antiseptic effect on undesirable bacteria. The Institut Pasteur of Paris eventually examined the observation that workers in the flower growing areas of France seemed less susceptible to tuberculosis than inhabitants of other locations. Exposure to essential oils was rightly deemed to be the cause, and among the most effective were found to be cinnamon, cloves, verbena, lavender, juniper, cedar, thyme, lemon, pine and wormwood. The practices of the Middle Ages were vindicated to a considerable degree by this discovery, and the effectiveness of thieves' vinegar was partially confirmed. The latter was a concoction of rosemary, sage, and pungent herbs steeped in sharp vinegar, and it was believed to repel plague. It was sprinkled about by those intending to plunder houses vacated by the plague stricken, but it was *not* always respected by the germ carriers.

Flowers, of course, have always been the principal source of perfume, although they are currently being overtaken by the chemist's flasks and test tubes. The earliest scents were more like unguents than anything else, and some of their recipes have survived. Among them is the formula for the old Egyptian perfume, Kyphi. No one knows just how old it is, but a list of its main ingredients found in the pyramid of Cheops mentioned juniper, sweet flag, cardamom, and myrrh. The Greeks, under the Ptolemies, later modified it, and Plutarch speaks of Kyphi as having some sixteen components, among them crocus, bdellium *(Acacia senegal),* and spikenard *(Nardostachys jatamansi).* Drying, powdering, sifting, soaking, and mixing took place in an elaborate process, and the final product was used as a fumigant, a perfume and in embalming.

The Egyptians had devised other unguents and perfumes, some of which were very costly. Oil of lily was greatly prized, as was Mendesium, made from myrrh, oil of ben *(Moringa oleifera,* also known as the Horseradish Tree because of the flavor of its roots), and canella, which was probably sugar cane, medieval nomenclature being as uncertain as it is. Another favorite scent was Metopium, a blend of almonds, honey, wine, resin, myrrh and sweet flag *(Acorus calamus),* and Cyprinum, a greenish tinted extract from henna flowers. Remnants of these perfumes have occasionally been accidentally sealed in

Roses invite noses to sniff for fragrance—look for bees before checking the aroma. Rose petals are often used in the making of perfume.

their containers, and found to retain faint traces of their original aroma even after some three thousand years. Although compounded in Egypt, the aromas generally owed more to the Greek and Roman rulers of that ancient world than to the heirs of the Pharaohs. Rome in particular cultivated vast tracts of roses in the delta region of the Nile, for use in the ceremonies and triumphs that took place in the imperial city so frequently at the time. Showers of fragrant rose petals and flowers would be lavished on the guests at Nero's banquets, sometimes even serving as funeral decorations shortly afterwards.

With the fall of Rome the Arab world moved into the forefront of discovery and development, thanks to the Arabs' possession of unaltered Greek texts, and their own centers of learning where knowledge was revered, preserved and discussed. They introduced the use of ambergris in order to delay the loss of fragrant volatile oils, and thus greatly extended the aromatic life of many of the perfumer's ingredients. The origin of this waxlike solid was long a mystery, assigned to sources as varied as submarine trees, fountains of the deep, and excretions of both fish and seabirds. Not until the whaling industry gained prominence was it recognized as an intestinal product of the whale.

The art of distillation, although known and practiced from ancient times, was greatly improved by the Arabic chemists. They devised the separate elements of the distilling apparatus, which consists of a retort, the portion holding the substance to be distilled, the condenser, which gathers and directs the volatile vapors, and the receiver which holds the resultant fully condensed fluids. By exercising increased control throughout various stages of the process the distillers could separate out particular elements from highly complex mixtures, and then carefully analyze them. The complicated procedures of modern industrial chemistry all trace back to the early practices of the Arabic makers of perfume.

Attar of roses, although not a distillate, is somewhat akin to the process of distillation since it traps oils in fluid, and then floats them to the surface where they may be gathered with relative ease. The concentrated oil of roses was discovered accidentally by an Indian princess who noticed a film that had formed about some rose blossoms and petals lying in a pool. The princess was probably apocryphal, but the event was not; this phenomenon had more than likely been observed by palace servants long before the sensibilities of the royal nose ever came on the scene. The attar was produced in Persia, India, and in Bulgaria, which is its modern center of production, with vast tracts of roses being grown annually for the perfume trade, though synthetics have made inroads.

Throughout the medieval period Europe had little interest in maintaining a pleasant smell; unwashed linen and barnyard odors affronted the nose, but with the arrival of the Renaissance and the Elizabethan age matters took quite a turn for the better. Cloaks and gloves were scented, floors were rubbed with rosemary, while perfume shops opened thei doors in Rome, Paris and London. Violets lef aromatic trails on the air, carnations wafted their spicy smell indoors, orange blossom offered new nasal delights, and once again the olfactory pleasures of Egypt, Greece, Rome and Arabia were revived. Geranium oil be came an important addition to the aromati arsenal, especially as an adulterant of many o the rarer and more expensive oils. Lavende from southern France and England, lent it clean, invigorating fragrance to linens, pre serving them from the ravages of moths, an permeated the household with a mos delightful scent, the very essence of dome ticity. Jasmine, that delicate damosel from the Orient and the tropics, breathed forth its light, inimitable sweetness, floating on the air of moonlit, marble palaces, shimmering like the ghost of frangipani flowers.

Nearly a hundred separate volatile oils were derived from flowers, then blended into innumerable combinations. Neroli was drawn from the bitter orange, *Citrus aurantium,* while vetiver came from the tropical blossom, *Vetiveria zizanioides,* and orris root was powdered from the rhizomes of *Iris pallida* and *I. florentina.* Lemon grass came from *Cymbopogon citratus,* cassie from *Acacia farnesiana,* and ylang-ylang, the flower of flowers, was extracted from *Cananga odorata.* The latter has been known in the Occident only since 1864, but in little more than one hundred years it has become almost indispensable, entering into nearly every perfume made. And to the list of natural oils may be added the scent of new mown hay, coumarin, now produced synthetically, violet, made from the chemical ionone, vanilla, from wood pulp, and a host of others born of the coal-tar, pulp wood, and petroleum industries.

The lure of perfume has spawned an extensive trade and manufacture of scent, that has grown mightily since Marie de Medici established it at Grasse, France, some four hundred years ago. The floral oils, necessary to the modern perfumer, fall far short of the demand, hence the heavy reliance on synthetics. For example, it requires 30,000 pounds of violets to produce one pound of oil. In Bulgaria well over 12,000 acres of roses must be grown to satisfy that country's suppliers of attar of roses. Billions of flowers are grown for their precious essential oils alone, and it is no wonder that the perfume makers have had to search out, or invent, alternate sources of supply.

One method of extending the materials available has been by means of dilution. Beginning as early as 1370, with the appearance of Hungary water, the practice of making colognes became increasingly popular. The concoction consisted of oil of rosemary in 92% alcohol. Some centuries later such "waters" gained the title of cologne because they were distributed from the city of that name. The sweet smelling water was made there by an emigrant Italian family, but it had to wait almost a century to become sought after, which it did once Napoleon's armies brought about its distribution throughout Europe. It was a truly international scent, having been formulated by the Italians, made in Germany, and popularized by the French. It contained the oils of rosemary, neroli, citron, and bergamot, steeped in three gallons of spirits of wine. Another favorite, once the monopoly of Tsars, was Russian leather, which was distilled from birch-tar oil derived from the wood and bark of the white birch, *Betula alba.*

With the arrival of the Renaissance came a renewed interest in fragrances. Lavender was used to add its clean aroma to linens and to preserve them from the ravages of moths.

Lately such a concept as a perfume center, as envisioned by Marie de Medici, seems to have vanished. All the great innovators of the past, Houbigant, Guerlain, and Coty have been replaced by chemists in white laboratory coats, working in concert with financiers from Tokyo, London, Los Angeles and Zurich. Their headquarters are linked by computers, which are apt to be "down" at any given and inopportune moment. Individual artistry has been strangled by "success," and technology is being subverted by an expanding scientific illiteracy. Nonetheless the sense of smell, generated from our genes and human capacities, will eventually prevail. Odors, like sweet, soft music dying/Keep the heart of memory asighing. Perfume, after all, is a blend of poetry and nature, having evocative powers that linger in the mind long after every trace of scent has gone.

The Fragrant Flower Garden

"Fragrance, perhaps, speaks more clearly . . . to age than to youth. With the young it may not pass much beyond the olfactory nerve, but with those who have started down the far side of the hill it reaches into the heart."

The Fragrant Path
Louise Beebe Wilder

Mary Ann McGourty

One of my most vivid memories of childhood, growing up on the coast of Virginia, is the sweet scent of gardenias that filled the early summer air. With the windows open to catch each welcome breeze, our house was filled day and night with the fragrance of the waxy white flowers. For many people fragrant plants are synonymous with old-fashioned plants, and they recall a time when the world and our own lives seemed less complicated. Perhaps that is part of their appeal.

Are "modern" plants less fragrant? In recent years hybridizers' efforts seem to be focused on creating plant varieties with larger flowers in a wider range of colors on hardier, more disease-resistant plants. While these new selections may be better in some ways than the old-timers, they are frequently less fragrant. It is certainly possible, however, to create a garden combining the best qualities of older plants with the improvements of the modern age.

Siting Scented Plants

The success of a fragrant garden depends as much on placement of the plants as it does on the choice of plants to include. You can situate plants to take advantage of existing conditions, or you can create conditions that will take advantage of their fragrant quality. Whether you are siting trees, shrubs or herbaceous plants, consider the direction and intensity of the prevailing wind. If it is gentle, it will waft scents to you; if it is forceful, scents will dissipate before you can appreciate them. Where wind is frequently strong, create a sheltered area near a solid wall or an L of the house. Scents are often concentrated and enhanced by the warm, still air present in these protected locations.

A good site for fragrant plants (and others as well) is by a frequently used door or walkway. Not only can you enjoy the beauty and fragrance of the plants as you come and go, but you are likely to give more attention to the maintenance of plantings in such a prominent location. It is hard to overlook a flower gasping with dryness or one being crowded out by some gigantic weed.

A convenient location near a pathway is almost essential for enjoyment of the earliest bloomers in areas where spring is invariably

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preceded by mud season. Few of us are willing to tramp regularly across soggy lawns, leaving footprints as we go, or to get muddy knees as we view and sniff some early treasure.

Summer-flowering shrubs and herbaceous plants can be enjoyed from inside the house, as well as in the garden, if they are sited near a window that can be opened for soft breezes to enter. And a sunny location enhances the emission of essential oils responsible for the fragrance of flowers. Use caution, however, when placing heavily scented plants under a dining room window, as the senses of smell and taste are closely related, and it is possible to end up eating fish that tastes like roses. My childhood gardenias were a constant source of irritation to my father at mealtime, and we often ate dinner with the windows closed.

Some flowers are fragrant after dark. These can be enjoyed in a small border or in containers near a patio or porch where you sit to relax after a day's work. In fact, many people find that sweet scents have a calming effect — just what is needed at the end of a busy day. Be sure to include white flowers by the patio, as many of them are fragrant, and white is the last color to disappear into the darkness.

Raised beds are especially useful for displaying and enjoying low-growing plants, as it is possible to place the nose near the source of the fragrance without resorting to deep knee bends or other calisthenics. Many herbs are arranged in this manner, but raised beds can also be used to advantage for small bulbs.

Timing

There are two different approaches to fragrant gardens. Some people have a romantic notion of wandering into the garden, to be overwhelmed by the intermingling of many powerful scents. This can be akin to putting a tape cassette of Dixieland jazz on your stereo, while the radio is tuned to the Metropolitan Opera, and a friend plays his rendition of Chopin's "Minute Waltz" on your piano. Overwhelming, perhaps, but can you appreciate each component?

Another approach is to set each kind of scented plant apart from the others in the garden, so that you can enjoy the plants individually. Sweet woodruff (*Galium odoratum*) then, would not be used as a ground cover under fragrant lilacs (*Syringa*), which flower at the same time in May. Instead, plant under the lilacs lightly scented early snowdrops (*Galanthus*), followed by a fragrant annual that begins flowering later; then use sweet woodruff under the early *Viburnum carlesii* or August-flowering summersweet (*Clethra alnifolia*). The most effective gardens (fragrance or otherwise) are those that provide a sequence of interest, whether the attraction comes from flowers, leaves or fruit. There is always something to look forward to as the season progresses.

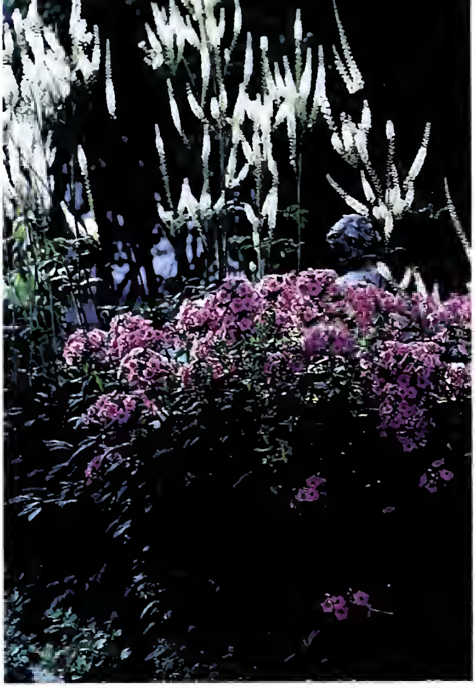
The plants chosen for any garden are a matter of personal preference. People like different scents, and individuals perceive fragrances differently. One person may like the heavy, sweet smell of mock-orange (*Philadelphus*), while another prefers the clean, lemony scent of magnolias and finds the mock-orange cloying and overpowering. The point is, include in your garden the fragrant plants that appeal to you.

How can you tell in advance which plants are fragrant? Sometimes there is a clue in the name, such as honeysuckle, sweet autumn clematis, *Myrrhis odorata* or *Osmanthus fragrans.* Also look for plants whose flowers have single rows of petals or that are naturally double. Those whose petals have been doubled by hybridization frequently lack fragrance, as the extra petals replace the plants' oil-bearing reproductive parts. This is the reason many of the showiest flowering crabapples and cherries lack fragrance and also do not set fruit.

Shrubs, vines, perennials, bulbs, herbs and annuals all have a place in the fragrant garden. We will look at a few perennials and bulbs here, as the other types of plants are covered elsewhere in this volume.

Scented Perennial Flowers

Among the old-fashioned flowers, peonies immediately come to mind. These come in a profusion of forms and colors, but many are not fragrant, or only slightly so. If in doubt,



Photos by Mary Ann McGourty

Cimifuga racemosa *and* Phlox *'Sir John Falstaff' complement one another and add fragrance to the garden. When planting for fragrance, consider the direction of the prevailing breezes which can waft scent to your open windows, porch or deck.*

choose peonies while they are in bloom. Most fragrant are the pink and white varieties derived from *Paeonia lactiflora,* such as 'Mrs. Franklin Roosevelt' or 'Sarah Bernhardt' (both deep pink). 'Duchesse de Nemours' is a good white, and 'Festiva Maxima' is white with red flecks. They are the latest to bloom in June and the longest in flower, but the large heads frequently topple after a heavy rain. Plant peonies in full sun in rich, well-drained soil with the "eyes" one to two inches below the soil level. Most grow two-and-one-half to three-feet high at maturity and will not require division for many years.

Another old-timer is red-valerian or Jupiter's beard (*Centranthus ruber*). It carries deep pinkish-red flowers on two-to-three foot stems in early summer, and there is also a white-flowered form. Because of its sometimes uneven growth habit, it will benefit from a moderate shearing after the first wave of flowers and will reward the tidy gardener with more flowers in late summer. It prefers a slightly higher soil pH than many perennials, so work a small amount of dolomitic limestone into the soil at planting time.

The border pinks (*Dianthus plumarius*) and border carnations (*D. caryophyllus*) with their mats of silvery foliage, are good front-of-the-border plants, provided drainage is excellent; but they will soon rot out in heavy soils where water collects. The spice-scented flowers on one-foot-tall stems are pink, white, red or bicolor in early summer. They prefer a loose soil in full sun and will also benefit from a little lime.

Cat valerian or garden heliotrope (*Valeriana officinalis*) has clusters of white flowers on four-to-five foot stems in June. The finely cut leaves are attractive throughout the season if plants are cut back halfway after flowering. This vigorous plant is fragrant day and night and will tolerate extra soil moisture without sulking. As the common name suggests, cats are occasionally attracted to the plant, and they can maul it as they do catnip though our own cats are only mildly interested. A few thorny barberry twigs stuck into the ground around valerian should solve the problem if your cat is hooked.

A plant worth seeking out is *Dictamnu albus,* the gas plant. Its flowers and leave smell of lemons on a hot day when the su draws its volatile oils into the air. Its taproo makes gas plant difficult to transplant successfully except when young. Spikes of pink o white flowers appear on two-to-three foo stems in late spring or early summer.

A mainstay of the mid-season garden is summer phlox (*P. paniculata*). Several white flowered cultivars are fragrant, includin 'World Peace' and 'White Admiral', bot blooming in August and September on three foot tall plants. A personal favorite is 'Sir Joh Falstaff', which is a clear salmon-pink in Jul Summer phlox grows best in moisture-retentive soil in a sunny location, but it will sti flower well in light shade. Powdery milde which frequently mars the leaves, can b controlled by regular applications of Benlat a systemic fungicide, beginning in late sprin New *Phlox maculata* 'Alpha' (mauve-pink

Masses of Narcissus poeticus *bloom at Brooklyn Botanic Garden. They are very fragrant.*

and 'Omega' (white with a pink eye) are reputedly less susceptible to mildew, though we have seen it thrive on them in shaded areas where air circulation is poor. Each has shiny lance-shaped leaves and bears flowers in cone-shaped heads instead of rounded clusters. They bloom in June with repeats in late summer if deadheaded promptly after the first wave of flowers. The all-white bedding phlox, 'Miss Lingard', a popular old-timer, is now usually included in this species. For the spring woodland garden, wood phlox (*P. divaricata*) and creeping *P. stolonifera* are fragrant, low-growing ground covers in white or blue. *P. stolonifera* also comes in a good pink color form, 'Pink Ridge', as well as a deep purple.

For the shaded spring garden, consider primulas, especially the English primrose (*P. vulgaris*). The species has single light yellow flowers on six-inch tall stems over clumps of basal leaves. The new Barnhaven strain includes several lovely pastel shades, as well as some with double flowers. Primroses maintain their vigor well if divided every second or third year and planted in moist, humusy soil. The cowslip (*P. veris*) and polyanthus (*P.* x *polyantha*) are also lightly fragrant and thrive under the same cultural conditions.

Sweet violets (*Viola odorata*) naturalize well in the high shade of deciduous trees, but they are frequently too spotty to make a dense ground cover. They will put forth a good flush of flowers in early spring and again in the autumn if they are well fertilized in soil that is not too acid. Some popular selections are 'Royal Robe' (purple), 'Red Giant' (deep red) and 'White Czar'. Try interplanting them with daffodils for a spring sensory tonic.

Daylilies (*Hemerocallis*) are not usually associated with fragrance, but several less well-known species, including the lemon or

Hemerocallis *'Hyperion' blooms in July and is one of the few hybrid daylilies with discernible fragrance.*

flava daylily (*H. lilioasphodelus*) have scent. One of the earliest to bloom, the lemon daylily, bears small yellow flowers on three-foot scapes in late May or June. This is followed in July by yellow 'Hyperion', one of the few hybrid daylilies with discernible fragrance. What a pity that hybridizers have tended to ignore the fragrant species when breeding for larger flowers and more frills.

Hostas are stalwarts of the shaded garden, but few have fragrant flowers. 'Royal Standard', 'Honeybells' and one of their parents, *H. plantaginea,* are valuable for their scented flowers in August, when many gardens are looking a bit down at the heels. The white pearl buds of 'Royal Standard' and *H. plantaginea* open into pure white trumpets held over clumps of spreading, shiny green leaves. 'Honeybells' is similar, with pale lavender flowers. Hostas are effective ground covers, and because most break dormancy late in spring, they are useful in hiding the yellowed foliage of early bulbs planted nearby.

Fragrant Foliage, Too

Some plants, including many culinary and ornamental herbs and also a few traditional garden perennials have the bonus of scented leaves as well as flowers. All parts of bee balm (*Monarda didyma*) smell of mint and oranges. Like many members of the mint family, it can spread rapidly from the root and become a garden menace if planted in moist soil in a sunny location. Control its takeover tendencies by planting a few sprigs in a bucket with drainage holes, which is then sunk into the ground up to its rim. The red-flowered bee balms, including the three-foot tall 'Cambridge Scarlet' and 'Adam', are the most vigorous, and they are prime attractors of hummingbirds. 'Prairie Night' and 'Blue Stocking' are somewhat taller and more maroon in color; 'Croftway Pink', a pastel three-footer, is less aggressive.

Autumn chrysanthemums (*C.* x *morifolium*) and feverfew (*C. parthenium*) have a pungency of flower and leaf that not everyone appreciates. Autumn mums come in many flower forms and all colors except blue. The low-growing, small-flowered cushion sorts seem to be the hardiest, and their longevity will increase if they are planted where soil drainage is excellent. Chrysanthemums benefit from adequate water and several light applications of a balanced fertilizer during the growing season. They flower best in full sun, although feverfew flowers well in light shade over a long period, beginning in June. You can control lanky growth of mums by pinching out the growing tips several times early in the season.

Many silver-leaf plants, including some artemisias and achilleas, have aromatic foliage. These dry-landers are at their best in full sun in light, sandy soil that drains well. Their silver or gray-green leaves add a welcome contrast to green foliage in the sunny garden. Southernwood (*Artemisia abrotanum*) grows three- to four-feet tall and is shrubby. Prune it back in early spring to maintain a compact growth habit. *A. ludoviciana* 'Silver King' and 'Silver Queen' have upright, three-foot stems that are handsome in dried arrangements or wreaths. The latter cultivar has slightly wider leaf blades, and, is thus somewhat showier. Both will romp if let loose in the garden, a situation easily controlled by a sunken bucket straitjacket. For the front of the border silver mound artemisia (*A. schmidtiana*) is choice, as its soft, silvery bottlebrush foliage catches light and reflects it. If clumps look shabby and open up in late summer, trim them back part way.

The golden yarrows, including hybrid *Achillea* 'Coronation Gold' (three-feet tall) and 'Moonshine' (two feet) have flat heads of yellow flowers held on strong stems over clumps of pungent, silvery, finely cut foliage.

These and other plants with aromatic foliage have other good qualities too. They seem to have fewer insect problems than other plants and are less often browsed by deer, who apparently do not like the strong taste of the leaves. Fragrance is most pronounced when the leaves are bruised or crushed; place aromatic plants by a walkway or door, so you can touch them as you pass by.

A Few Bulbs

Many spring and summer bulbs have a faint earthy scent if we bury our noses in their flowers, but a few are notable for their sweet aroma. Among fragrant daffodils the small- and medium-flowered kinds predominate; most have two to five flowers per stem. *Narcissus jonquilla* hybrids and selections, including 'Lintie', 'Suzy' and 'Trevithian', prefer a sandy soil that dries out in summer. *N. tazetta* types are very fragrant, but many are not reliably hardy in the North. 'Cheerfulness', 'Canarybird' and 'Geranium' are worth a try. Late-flowering *N. poeticus,* the old pheasant's eye, including 'Actaea', is good for naturalizing and will tolerate some moisture. Grow daffodils in full sun or in the shade of deciduous trees. They should thrive undisturbed for years if planted in well-drained, root-free soil and fertilized annually as the leaves emerge.

All varieties of spring hyacinth (*Hyacinthus orientalis*) are fragrant and reasonably winter hardy, but they have a stiff, formal appearance in the garden. This effect can be softened by allowing them to come up through a loose ground cover such as vinca or sweet woodruff.

Lilium regale, the regal lily, is regal indeed. In July its large white trumpets on five-to-six-foot stems dominate the garden and perfume the air day and night. Regal lilies have no basal foliage, so group them in the center or rear of the border where shorter plants will hide the lilies' leggy stems. Aurelian hybrid lilies such as 'Black Dragon', 'Pink Perfection' and 'Golden Splendor' are similar in bloom time and appearance. Shorter (three to four feet) Oriental hybrids with recurved petals extend the fragrant lilies into August and September. Pink-flowered 'Uchida' and pure white 'Arctic Treasure' are deservedly popular; provide a skirt of foliage for them too. Lilies grow best in rich, well-drained soil. Some prefer full sun, but many benefit from light afternoon shade, which keeps their colors from fading.

There is a wealth of other fragrant plants for experimentation. By the careful choice and placement of perennials and other scented plants, the gardener can easily have a garden of interest from spring until fall, one that appeals to the nose as well as to the eye. ❧

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Daffodil Mart, Rte. 3, Box 794, Gloucester, VA 23061

Far North Gardens, 16785 Harrison, Livonia, MI 48154 (seeds, including Barnhaven primroses)

Fragrant Path, P.O. Box 328, Fort Calhoun, NE 68023 (seeds)

Hillside Gardens, 515 Litchfield Rd., Norfolk, CT 06058 (no shipping)

Holbrook Farm & Nursery, Rte. 2, Box 223B, Fletcher, NC 28732

Van Bourgondien Bros., P.O. Box A, 245 Farmingdale Rd., Babylon, NY 11702 (bulbs)

Wayside Gardens, Hodges, SC 29695

White Flower Farm, P.O. Box 50, Litchfield, CT 06759

Fragrant Annuals

. . . the sowing of a seed seems a very simple matter, but I always feel as if it were a sacred thing among the mysteries of God. Standing by that space of blank and motionless ground, I think of all it holds for me of beauty and delight, and I am filled with joy at the thought that I may be the magician to whom power is given to summon so sweet a pageant from the silent and passive soil.

—Celia Thaxter

Edward R. Rasmussen

The number of significantly scented annuals is not so great that most of them cannot be mentioned in an article of this scope. For the same reason, a garden of moderate size could accommodate them all in the space of a season or two. It is a pleasant task to decide which to plant.

Many people think of annuals as temporary fillers to be used until perennials can take their place. Others, preferring to start with a

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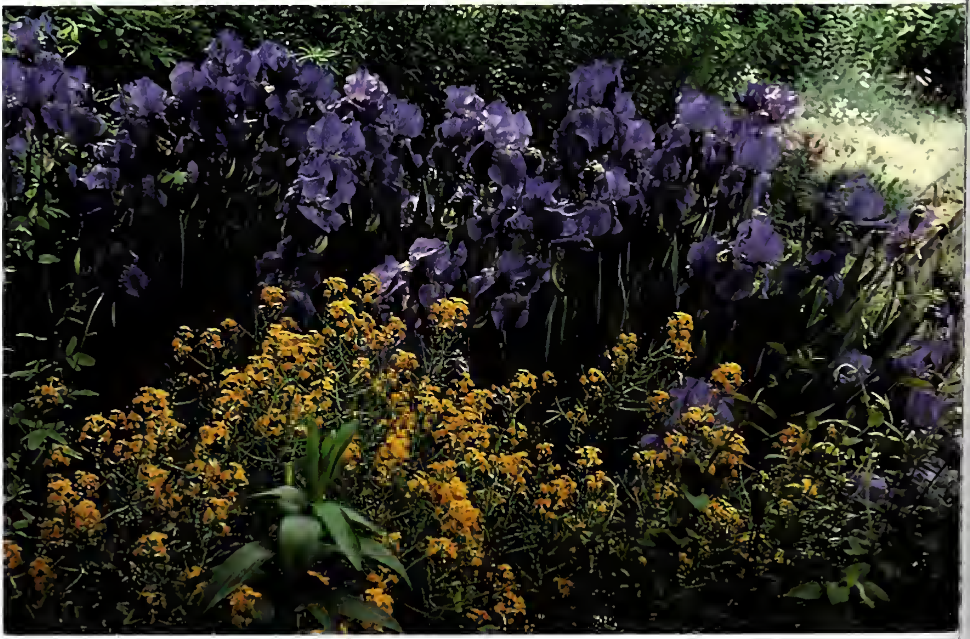

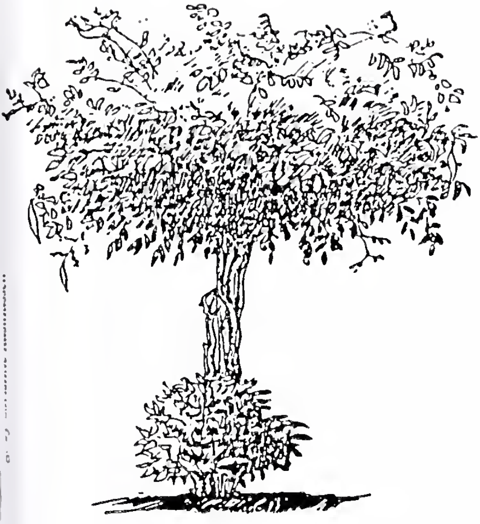

Trumpet vine trained into a standard with a peony at its base.

clean palette each season, sow only annuals. The most colorful and interesting garden combines both. Perennials furnish a framework and sense of continuity, while annuals offer an extended blooming season and some of the brightest, most colorful flowers. New annuals can always be tried next year.

This list of fragrant annuals begins with *rtemisia annua* which is commonly known s sweet Annie or sweet wormwood. It is a tall, ank-growing plant that might be used as a ummer hedge in place of kochia as it serves he same purpose with the bonus of fragrant oliage that can be used for wreaths when the eason is over. Lacy as any fern, it is good as a oil in the border and to cut for filler in rrangements.

The sweet sultans, *Centaurea imperialis* nd *C. moschata*, are quite fragrant and such erviceable plants that any garden will benefit rom their presence. They flower all summer n white, yellow, and shades of pink-through-purple on long stems that are good for cutting. Tolerant of poor soil and drought, they grow to about three feet in average conditions. Native to the Middle East, their common name is derived from the Sultan of Turkey who had a great affection for them.

is germanica and Cheiranthus cheiri *make a ramatic combination. Wallflower is among the ost fragrant of plants—it does not like hot eather, but is worth a try.*

A biennial in most of its forms, the wallflower, *Cheiranthus cheiri*, grows best in the British Isles and the Pacific Northwest—hot summers are not to its liking. Still, along with its relatives dame's rocket and common stock, it is among the most fragrant of plants, so it is worth some effort to have. In Parkinson's time it was so valued for its sweetness that it was a likely constituent of any nosegay—thus its Latin name, which means 'handflower'. Fortunately for those of us who live in climates too cold for it to overwinter, there are such annual strains as 'Paris Market' and 'Early Wonder'. If started early these can bloom before the weather gets too hot—or failing that, they can wait until summer's heat is gone.

A curiosity that is seldom seen today is Queen Anne's pocket melon, *Cucumis melo dudaim*, also known as sweet-scented or pomegranate melon. The inedible fruit is so small it can be tucked into the purse or pocket for use in confronting foetors and effluvia. Vilmorin-Andrieux says it is used as an ornamental climber on trellises and arbors.

To add a tropical feeling to the garden or veranda, the daturas, with their luxuriant foliage and great trumpet-shaped flowers, might be worth considering. Those worth growing for annual decoration come mainly from the species *Datura metel*. The flowers are commonly white, yellow or purple and single or trumpet-in-trumpet in form. Start them early indoors, as you would tomatoes, for a longer blooming season, or grow in a pot as a specimen. They are highly fragrant at night. All parts of the plant are poisonous.

The *Dianthus* tribe offers many and varied fragrances, but unfortunately the annual sorts are not fragrant. So associated are *Dianthus* (the Latin name means flower of the Gods) with rich and spicy odors, that one can hardly help be disappointed when, upon raising one to the nose, it is found to be mute. If you wish

Dianthus superbus

your annual pinks to speak, there are several that might be tried. The scentless Chinese pinks crossed with the carnation have given us a fragrant race called Marguerite carnations. Sown at any time, they will bloom in five months and continue until frost. 'Dwarf Fragrance' is a shorter version, and 'Sweet Wivelsfield' is a different cross that can be similarly treated. One of the most redolent of the lot is *Dianthus superbus*—I have detected its perfume from up to thirty yards away on a calm evening. It is normally a biennial to perennial, but if started early enough it will make a showing the first fall before exhausting itself the following summer.

The hyacinth bean, *Dolichos lablab*, has a delicate scent difficult to describe. Its fragrance is very similar to that of the grass *Sporobolus heterolepis*, prairie dropseed. Hyacinth bean has either white or purple flowers that are good to cut; if left to mature they form ornamental seedpods. This climber does not get leggy at the base as many others do.

Another odorous, robust clamberer is the mock cucumber, *Echinocystis lobata*, native to the eastern half of North America. It is useful for screening and covering unsightly objects since under favorable conditions its growth is very rapid—up to thirty feet in a single season. If the prickly pods are cut before they mature, they make very curious and interesting material for drying. Celia Thaxter describes the "large, loose clusters of starry white flowers" as "having a pure, delicious fragrance like honey and the wax of the comb."

A third member of this exclusive group of twining odorous plants, and also a rapid grower, is the moonflower, *Ipomoea alba*. Its white six-inch trumpets open in the evening and diffuse a powerful clovelike perfume—the flowers open rather quickly and can be interesting to watch. As with other ipomoeas, this vine should not be planted in too rich a soil or will run to rank growth with few flowers. If planted in a place where the morning sun doesn't reach it, the flowers may stay open longer.

Nearly everyone is familiar with the sweet pea, *Lathyrus odoratus*. Hundreds of varieties have been used since it came to the florists attention in 1870, and more are coming. The old grandiflora varieties seem the most fragrant. They are also more tolerant of adverse growing conditions than many of the more recently developed strains. If you wish to grow the larger, fancier types and have the conditions to suit them, then look for those that are noted for their fragrance in the catalog descriptions.

Nasturtium, *Tropaeolum majus*, is no often thought of as a climber. However, som of the taller varieties can reach eight feet an with a little training make a very showy an effective screen. The common name mear nose-turning" and refers to the pungentl scented foliage, but the flowers are ofte sweetly fragrant too, many times with pungent undertone. Plant in full sun and so that is not too rich. If they are growing rank at the expense of bloom, sometimes pinching off some of the leaves will throw them into blossom.

White-flowered gourds, *Lagenaria siceraria*, which are the larger gourds, make interesting vigorous climbers, and their large white flowers are fragrant. Also, some other plants that we may not think of as being scented, if caught at the right time and condition, may be significantly perfumed. One morning a visitor to the garden walked up to a morning-glory (*Ipomoea tricolor* 'Blue Star') for what I thought would be a nuzzle with disappointment, but she exclaimed "old-ladies face powder" and upon inspection I had to concur.

A strongly scented annual that is seldom seen is Moldavian balm or dragonhead, *Dracocephalum moldavica*, which has gray-green foliage and lavender-blue flowers in long spikes for most of the summer. Quite hardy, and growing to about a foot and a half, it is easily raised from seed directly sown. Both the foliage and flowers smell of lemon and the plant is very attractive to bees and butterflies.

Erysimum asperum, known as the Siberian wallflower, must derive its name for its very hardy nature, for it is native from Ohio to the Rocky Mountains. Generally a biennial, it can easily be used as an annual if sown early. Related to the true wallflower, *Cheiranthus cheiri*, *Erysimum* might be a better candidate for areas too hot and too cold for the former. The scent, a combination of clove and lily, is similar as well.

Nicotiana alata

Heliotrope, fondly known as cherry-pie plant, *Heliotropium arborescens* (*H. peruvianum*), is a useful plant from Peru. It is actually a perennial, but is often used for summer bedding, tub plantings, hanging baskets and standards. It cannot tolerate any frost, so it must not be set out too early. There are dwarf strains with deep purple flowers, but these have little scent—the paler flowered taller strains seem to be the most fragrant with an almond-vanilla scent.

A familiar and much used edging and carpeting plant whose flowers have the refreshing aroma of newly mown hay is *Lobularia maritima* (often still listed as *Alyssum maritimum*, the ubiquitous sweet alyssum. Do not expect much in the way of sweetness from the colored varieties, for they have very little. Most of the white varieties still have good fragrance—especially the type plant—and 'Little Dorrit' and 'Carpet of Snow' are two good dwarf variations.

Pineapple weed, *Matricaria matricarioides*, is a little plant of scant ornamental value that grows in inhospitable waste places and disappears by midsummer. It is nice to have in walkways as it is carefree and is quite fragrant when trodden upon. In California it is known as manzanilla. A fine tisane is made from the leaves and flower heads as well.

There are two species of *Matthiola* that belong in every fragrant garden: *M. longipetala* (formerly *M. bicornus*), evening stock; and *M. incana*, common stock. The former might be mistaken for a weed for it is a rather forlorn looking. But at night its sweet, searching scent makes it desirable. Sow it along a path or under a window where its fragrance may be enjoyed.

Common stock is available in many forms and colors—the double-flowered forms are most fragrant. Whole villages of the weavers of Saxony were once devoted to raising stocks—and only one color was permitted to be grown per village to keep the strains pure. There are both annual and biennial types and ones for different seasons of the year, so be sure to choose with this in mind.

A denizen of many an old-fashioned garden, the marvel of Peru, *Mirabilis jalapa*, can be dug in the fall and stored like a dahlia. However, it comes so quickly from seed that it is nearly always treated as an annual. The flowers smell of citrus and may be yellow, crimson, pink, white, or various combinations of these; if you find one you particularly like you may wish to store the tuber. The flowers open in the late afternoon giving rise to its other common name, four o'clock. The blossoms also attract the hummingbird moth.

Another genus much favored for evening fragrance is *Nicotiana*, ornamental tobacco. The most common of the three species considered here is probably *N. alata,* jasmine-tobacco. There are now many dwarf forms in various colors, but they have little fragrance compared to the tall night-flowered parent. It is not much to look at during the day, but it is worth having for its wonderful scent.

Nicotiana suaveolens, a sweet-scented native of Australia, is one of the only tobaccos not indigenous to the Americas. As it is of shorter stature and finer texture than most it is of more value to those who don't have room for the larger *N. sylvestris*, woodland tobacco. This floral giant can reach six feet in a season and makes a novel accent in a group of three. The freesia-scented flowers are borne in panicles at the top of the plant but droop down, making sniffing easier—though it isn't really necessary as it is free with its fragrance.

Although I don't intend to deal with the annual herbs, I might mention that purple-leaved basil has value in the border for its colored foliage and flower spikes. Holy basil, *Ocimum sanctum*, is also very fragrant, and the stem base is cut into beads for rosaries by Hindus who plant it about temple gardens. Allowed to mature their spikes of seed clusters make good material for fragrant dried arrangements, or for tying in bundles to be tossed on the coals of a fire.

Since there are so many varieties of petunia and their ranks are always changing, shop by smelling the flowers for fragrance. The best scents are found in the purple and white types, and they are usually most perfumed at night.

One plant which likely would never have received the attentions of the florist were it not for its distinctive and powerful fragrance is mignonette, *Reseda odorata*. Napoleon encountered it as a little weed in North Africa and sent seed to the Empress Josephine. It subsequently was named Mignonette, 'little darling', by the French. It is very nice to have along a path or near a dooryard or patio or in a pot where its perfume can drift. Some of the more modern varieties are not as fragrant as the less developed sorts. A similar scent comes from the vineyard when certain varieties of grape are in bloom—some describe it as grapeflower and sweetpeas—an intoxicating combination indeed.

Scabiosa atropurpurea, known as sweet scabious, pincushion flower and mourning

Nicotiana sylvestris, *woodland tobacco, is one of the plants noted for its evening fragrance. This one can reach six feet in height.*

Lobularia maritima, *sweet alyssum, is often used as edging and carpeting plants and lends the aroma of newly mown hay to the air. Here it is combined with parsley, verbena and sempervivum.*

bride (for the somber color of the original type) has long been a popular flower for garden decoration and for cutting. A plant of open fields, it needs an open, sunny position in the garden. It is available in many colors, but the purple-black and sky-blue are the most richly scented.

A plant that possesses the scent of lily-of-the-valley is the wind poppy, *Stylomecon heterophylla*. Growing to no more than two feet, it can be given poppy culture but with a little shade. The flowers are brick-red with a dark eye and are good for cutting if treated like Iceland poppies.

Some think of the marigold as a fragrant plant and some consider it merely malodorous. But the signet marigold, *Tagetes tenuifolia* 'Pumila', has a scent that can be appreciated. It is less than a foot high with finely incised foliage covered in masses of brilliant single flowers. Roy Genders considers its foliage ". . . more refreshingly aromatic than of any other plant, the lemon verbenalike perfume remaining on the fingers for an hour or more after pressing the leaves." Some varieties to look for are: 'Golden Gem', 'Lemon Gem' and 'Paprika'.

Schizopetalon walkeri is a delicate small annual from Chile. It doesn't have a common name. The feathery pure white flowers are powerfully almond scented. It resents root disturbance and must be directly sown, or started and kept in pots. I once saw it described as easy, but I have yet to succeed in flowering it, though I have tried several times. I have a few seeds left and I think I'll probably give it another try this spring.

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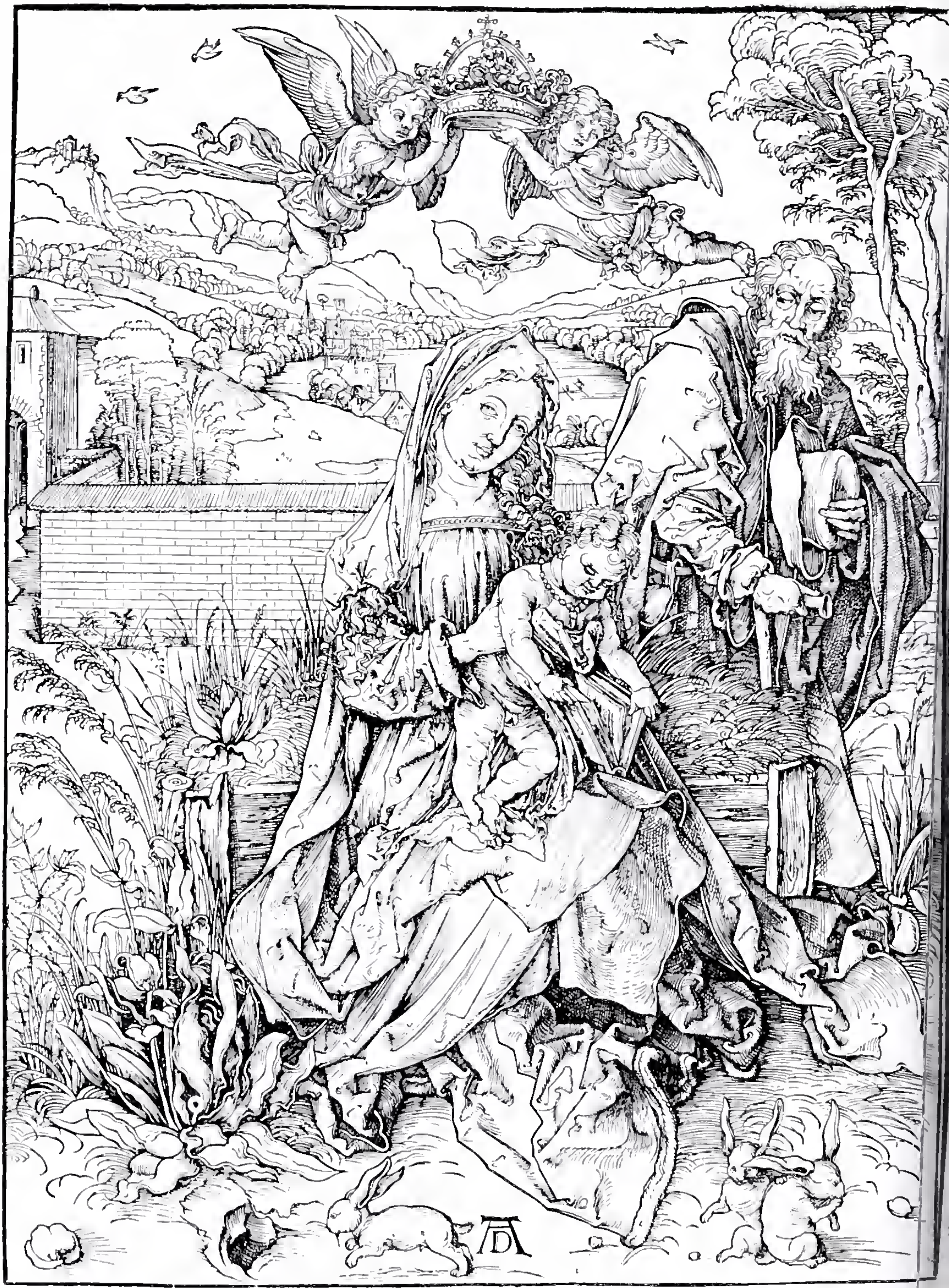

Turf seat: The Holy Family with Three Hares. Albrecht Dürer (1471-1528). The Metropolitan Museum of Art, Gift of Junius S. Morgan, 1919 (19.73.168)

Landscaping with Fragrant Herbs

James Adams

In every garden there should be at least one place inhabited by temptations that lure noses and entice fingers. It may be an entranceway with fragrant herbs hugging a gate; scented creepers frolicking between stepping stones; tapestries of spicy herbs spilling from perches; a lush counterfeit lawn, an herbal carpet awaiting the soles of the venturesome; or here and there a bench or chair, an invitation to relax on a seat that is itself a garden—a living, fragrant turf seat.

Each of these commonplace components of the landscape—entrance, pathway, wall, lawn and seat—can be made memorable, and fragrant herbs are perfect for the task.

"Basil, Rocket, Valerian, Rue,
(Almost singing themselves they run),
Vervain, Dittany, Call-me-to-you—
Cowslip, Melilot, Rose-of-the-Sun"

These are some of the herbs that inspired Kipling. They are but a handful of the hundreds of fragrant treasures we may plant in our gardens.

Let's begin with the most celebrated of all, the jasmines and roses. Within these two remarkable groups are the twining, twisting, and climbing herbs that decorate and scent simultaneously and bear sweet-smelling flowers for lengthy periods if pruned and pampered. The very best of the jasmines are the evergreen Arabian (Zone 7-10) and the harder 'Revolution' and poet's jasmine (Zone 5-10). Many trailing and climbing roses are hardy in the north. The memorial rose spreads quickly and is evergreen in warmer climates, while the chestnut rose is tolerant of poor soil and salty sea breezes and exceptional for smothering gates and fences.

These and other fragrant vines, including varieties of honeysuckle, grape, yam, and passiflora, are valuable for cloaking an arbor; clambering over archways and up trellises; espaliered on walls; gamboling over mounds of stone; or charmingly overpowering a gate. Use them alone or in sympathy with other colorful ornamental vines to provide fragrant air anywhere.

Jasmine, passion flower, and cinnamon vine (Chinese yam) adapt to containers that can be moved about in the garden to entertain guests wherever they roam. These vigorous climbers need heavy pruning to ensure a full crop of fragrant flowers. Don't forget the ordinary grape—the mouth-watering odor of sun-ripened concord grapes is memorable.

Three bushy evergreens that add grace and fragrance to the entranceway are lavender, rosemary and southernwood. These herbs can be pruned and shaped as desired, conforming to most demands in any landscape—formal or contemporary. They are equally suited to growing informally about a small bench.

Lavender's legendary essence is borne predominantly by the flowers, and it is reminiscent of the fine bath salts and delicate perfumes that rely on it as a main ingredient. Although the foliage is fragrant when handled, lavender is at its peak as flowers begin to open. Several plants can scent an entire yard. The lavenders come in many costumes. The cultivars 'Hidcote', 'Munstead', the pink-flowering 'Rosea', and the dwarf lavender

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ames Adams, a freelance writer who lives in Washington, is the author of Landscaping With Herbs *(Timber Press, 1987). He enjoys growing his own herbs and cooking for his wife and five children.*

The author's garden contains a large rosemary on the left plus a potpourri of violets, monarda, oregano and cardoon.

'Nana' have the best shapes and respond to pruning. Grow lavender in coarse, sandy, limed soil surrounded by a one-inch layer of sand. Do not overwater.

Southernwood, a relative of the bitter, medicinally scented wormwood, is semi-evergreen, losing much of its foliage and fragrance during the winter. The cultivar 'Camphor' retains its aroma, however, and remains evergreen to about Zone 6. Use all the southernwoods, particularly those with a citrus scent, on corners where paths intersect so that their soft, feathery branches will be brushed by passers-by, leaving their clothing smelling sweetly of pine and lemon.

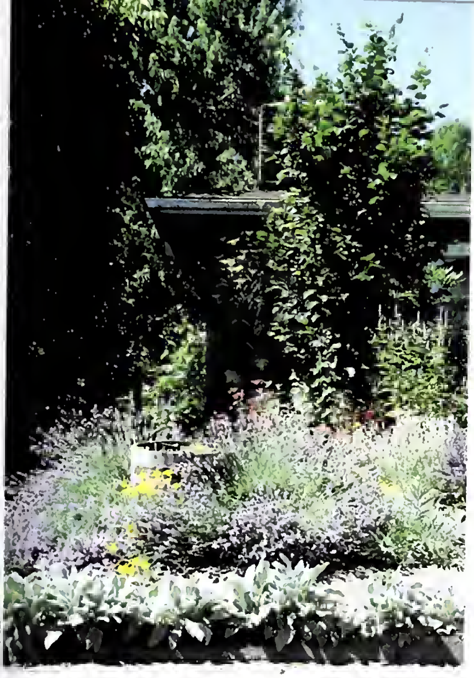
Rosemary is another pine-scented herb whose fragrance is remarkably perfumelike and is a popular ingredient in herbal hair and bath products. In the garden rosemary can be used in many ways. The upright varieties, which include white-flowering, pine-scented, 'Tuscan Blue' and 'Majorca Pink', can be used to create exceptionally fragrant hedges that can grow from four-to-six feet high and wide. Rosemary hedges work well encircling a bench or patio. They are commonly used as fragrant screens enclosing private niches in the landscape. A stroll through a rosemary hedge en route to a hidden garden is a special treat when in full bloom.

The creeping varieties of rosemary, including 'Huntington Carpet' and 'Lockwood de Forest', are more versatile and may be substituted for junipers. They can be used along entranceways or allowed to fall from ledge and elevated containers. Always arrange them so that their branches extend well into pathways where they will be brushed and bruised

Creeping rosemary is especially suited fo use in the fragrant bench—a large, raised container that has a seat surrounding the whole Center plantings in an 18 to 24 inch-wide be (9 to 12 inches from seat) and allow at least 1 to 18 inches between neighboring plants Train the rosemary to spill outward over th bench. On a fragrant bench one sits beside not on, the herbs. Always provide spaces o the bench for unobstructed sitting. Use winter-flowering rosemary in warmer cl mates, or an evergreen lavender or creepin savory in colder areas. For a treat use th herbaceous Persian catnip, which has clovelike scent.

An herb that works well in pathways creeping thyme. There are many varietie some of the most useful form dense carpe only one-quarter-to-four inches thic Although they must be stepped on to relea their odors, a crop of flowers of 20 or mo will perfume your garden.

The thicker mats of caraway thyme, 'Cle Gold' thyme, the true Mother of Thymes, 'Fo terflower', and the lemon-scented 'Whi Magic', should be encouraged to grow into t path and to be trampled by passers-by. Oth



A collection of lavender, spearmint, monarda, California poppies, lamb's ears and achillea make a colorful tapestry in this garden of mixed herbs and perennials.

mat-forming, but less resilient thymes include he golden lemon, silver, and English. Display hem beside the path to contribute fragrance rom their flowers or from fondling by nquisitive hands.

The thinnest mats of creeping thyme include the gold-flecked 'Mayfair', 'White Moss', 'Tuffeted', and the wild thymes, 'Pink Chintz', crimson and woolly. A hot, midsummer sun will bake the fragrances of all of these thymes together into a delicious potpourri in your garden. Be sure to provide a corridor in which they can be spread between paving stones. Allow a space one-to-two inches wide and two inches deep. Let them establish themselves and then begin to prune or mow to remove damaged branches. Do not be afraid to force them lower and lower into a more resilient mat. Give them every opportunity to bloom, but otherwise mow them as often as you do your lawn, setting the mower to a height that just keeps them neat.

Some of the bush thymes, such as French, 'Orange Balsam' and the golden 'Doone Valley' can be used on embankments that contain narrow trails. There they can be brushed by pants cuffs and skirts but not stepped on. Prune them back a few inches to expose new growth after their flowers have turned brown. Thick banks of bush thymes may be used to encircle a sunken patio.

Two mints that are tops for carpeting a pathway are English pennyroyal and Corsican mint. Pennyroyal's value lies in its preference for the middle of the path where it spreads, oblivious to busy feet. In this situation a gardener can't be particular about appearance

avenders flank the walkway in the Adams' Washington State garden. Lavender's fragrance omes mostly from the flowers, but the leaves are lso fragrant when brushed.

for it is a sweet-smelling herb asking to be crushed.

Corsican mint is simply astonishing. Growing between paving stones or along fissures in a rock wall this diminutive mint packs one great minty wallop if bruised. Bricks with planted holes create an interesting pattern when Corsican mint peeks up at you from a multitude of green eyes. Full sun plenty of moisture and foot traffic are necessary. Without wear and tear it would overgrow, become spongy and less hardy. Constant traffic ensures a firm, healthy ground cover no thicker than one-quarter inch. It is not evergreen in colder climes but it will do well to Zone 6.

'Trenague' camomile is flowerless and grows slowly into a cushion that is so soft it beckons to be touched. Roman camomile, the flowering form, is more hardy and may be substituted, but it is not nearly as compact in habit, and its flowers require frequent pruning. Unhindered, 'Trenague' camomile forms lush, mossy tuffets, so if you want it for a pathway remember the camomile rule: 'A camomile bed, the more it is trodden, the more it will spread.'

Planted in a pathway, where it will constantly nurture weary feet, camomile will become a compact mat no thicker than one inch. Provide full sun, plenty of moisture, and an easy way for it to thread the maze of paving cracks, and this apple-scented herb will become a carpet.

Before we go on to other herbs, let's consider a turf seat of camomile. The turf seat is essentially a container with a fragrant herb doubling as a seat cover. The turf seat dates from antiquity. Amphitheaters, for sports or community activities, encircled by 'turf bleachers' are the earliest documented. They were simple to construct, cooler than stone, and cleaner than bare soil. Native meadow grasses were used as the living cover, and mowing was done by goats and sheep.

Gardeners in the Dark and Medieval Ages, inspired by the stale air within a castle's walls, employed turf seats to entertain and comfort. A mound of earth was pushed up, flattened, and planted with fragrant meadow plants or imported herbs that saturated the air with a richness. By the Middle Ages turf seats had grown in favor and been given form with brick and stone. They often stood alone, sentinels to many a knot garden, a spot to sit and reflect upon some gardener's handiwork. Garden seats everywhere came to be dressed with scented herbs because they afforded so remarkable an experience for so little effort. "Like the Temple Gardens at Thessaly, raised with gravel and sand, having seats and banks o camomile; all this delighteth the mind an bringeth health to the body" remarked Law son in his 17th century opus *A New Orchar and Garden.*

As the informal landscape became popula patios and gazebos stocked with chairs an umbrella tables were a part of the scene. Th notion that turf seats belonged in the forma garden hastened their unpopularity. Thes manicured lawns are beautiful, but often to vast and remote to draw us into it. A garde should evoke intimacy, and turf seats can hel restore that atmosphere.

Re-creating a turf seat is a joy. It is even mor rewarding to occupy, and the only way to kee it healthy is to pamper it with a well place posterior. Stone, brick, cement block, c wooden-tie containers can be constructe against a wall or fence, or used as free-standi planters on a patio.

A whiskey barrel cut in half is an excelle and inexpensive container for a turf seat. Firs to extend its life, drill or saw drainage holes the base. Second, raise it off the soil using fl stones or treated wood. The sitting height the container should be about 18 to 22 inche Third, fill it with a standard potting mix which has been added a bucket of sand an bucket of dolomite chips or oyster shell– ratio of 10:1 soil to shell or chips. Water t adjusted mix and as it settles add more mix keep the level of the soil flush with the top f the container.

One plant (four-inch pot size) will spread cover one square foot the first season. U from four to eight plants. Some herbs spre faster than others, but as a rule of thumb creeping thymes are fastest, then camomile. The slow-poke is Corsican mint. Be careful to look for bees before sitting.

These herbs grow best in full sun. Since frequent watering will lead to mineral depletion, add nutrients. As the herbs grow and spread, sit on them. Call it conditioning. This is the only gardening activity I know of that insists on inactivity for the health of our plants. It is important to press them into the soil regularly to encourage rooting all along their branches. Water to develop deep rooting. Rather than flooding the top, use a two-inch pipe embedded eight-to-ten inches in the center of the container to apply water. This method also keeps your clothing dry. At the base encourage more fragrant herbs to grow outward into the paving or onto a path or patio.

You may expand this treat for the feet into an herbal lawn. Use the same techniques as for quality grass lawns, substituting the turf-seat herbs and keeping them trimmed to one-half-to-one inch with a weedeater or mower. Herbal lawns, or meads, rarely need any care except for a top dressing of manure or mulch each fall. Fertilize twice yearly. If never mowing is more to your liking, a shady mead of sweet violets makes a pleasant yard, especially with bulbs planted everywhere. Many bulbs, like saffron, are delicately scented and if planted en masse are a treat for the nose. Sweet woodruff is another shady mead herb. You'll find yourself becoming lost in a patch as its flowers spread their scent into the cool, dark woodsy recesses of the garden. Flowering lasts for several weeks in the spring.

In a partially sunny spot mint, English pennyroyal, camomile and chives should accompany sweet woodruff and violets to contribute fragrance for the rest of the year. In late summer, before winter takes them all, harvest herbs for yourself, dry them and hang them swaglike on a door to freshen the air indoors, or crush them into a carpet before vacuuming for a fresh meadowlike scent.

Arranged in a patchwork quilt pattern, herbs and alternating paving blocks can create an entertaining patio feature. Such checkerboard gardens were popular on country estates in the eighteenth-to-nineteenth centuries. Carpet-smooth and low-profile herbs were substituted for squares of paving in a ratio of 1:4 to 1:10. Taller herbs such as valerian, sweet fennel, and meadow sweet and fragrant shrubs and trees inhabited squares on the outer edges. All the year-round a table and chairs would be strategically relocated near the most alluring features.

Containers of fragrant herbs go well with this design. Even the oldest soliloquies speak of the merits of an urn overflowing with herbs. Urns, buckets and troughs offer a home for nature's finest aromatic annuals such as German camomile, coriander, sweet marjoram, and basil. The purple-hued 'Krishna', 'Dark Opal', and cinnamon basils are the most fragrant of this family. German camomile's spicy apple scent is welcome on any patio. Put them all together and add a pot of summer savory, and their combined scents are reminiscent of crowded spice markets.

Whether we enter or leave a garden we open a gate. It is the garden gate, with a garland of herbs that supplies the visitor with a summary of what is to come or what has been experienced. Yet opening a gate can be more than a mere action; the moment can become an event to remember. A gate door that clears the ground by six-to-eight inches as it swings will pass over herbs placed beneath it. The best herbs for this rough job are the mints: black, orange, ginger, spearmint, apple, lime, and pineapple. Prune them to force bushy growth and discourage flowering.

Equally as rewarding under the gate are lemon balm, camomile, costmary, santolina, clove pinks, and English pennyroyal. With every swing the gate creates its own perfume. It is a greeting and a farewell, an opening to a garden that is worth entering again and again.

Distinctive and Pleasing Fragrances From Trees, Shrubs and Vines

Gary L. Koller

In building a garden of fragrance one needs to look at trees to create the ceilings and upper walls of garden rooms, shrubs to form intermediate and low walls, as well as barriers, dividers and enclosures. Vines are efficient at conserving precious ground-level space while at the same time they can be used as upward-climbing green garlands that soften the harshness found in many urban landscapes. Woody plants are the elements that provide structure and form in the garden and landscape year-round. It is important to select them carefully so that they function as elements of structural design even when they are not emitting a scent or fragrance

Many plants are fragrant and this list only presents a handful of those available. In making selections my criteria included plants with fragrances strong enough to be detectable from a distance and fragrances that most people find desirable. (Many plants produce a fragrance that a majority of people find undesirable or offensive and these are not included.)

Before making a selection of any of these plants I recommend that you make a personal smell test to determine that the fragrance is one which pleases you.

Fragrant Shrubs

Butterfly-bush (*Buddleia davidii*)
8-12 feet tall and 6-10 feet wide, full sun
hardy to 0 to −10°F.

A deciduous shrub that in the south car become large and open in habit while ir northern areas is usually dense and bushy due to stem damage from winter cold. Thi plant blooms on new-season wood and ever if it dies to the ground during winter, it wil grow and bloom during the summer Flowering occurs in midsummer and depending on the cultivar, flowers rang from white to pink, blue, and pale yellow The blossoms are fragrant and they als provide visual enjoyment, as many forms o butterflies delight in this plant.

Carolina allspice (*Calycanthus floridus*)
6-9 feet tall by 6-10 feet wide, full sun t
light shade, hardy to −20°F.

A large deciduous shrub that bears larg leaves that are dark-green in summer an yellow and amber in the autumn. Flower appear in midsummer. They are about tw inches across and dark reddish-brown. Th low visual profile is made up for by a stron fruity fragrance. This plant is easily grow and because of its healthy, dense foliage, makes a desirable filler plant in a shru border. One should note that in nurseri this species is often confused with anoth species that lacks floral fragrance. In ord

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Viburnum carlesii *is a deciduous shrub that blooms in early May in the northeast. Buds are pale pink opening to white and intensely fragrant.*

to make sure you are acquiring the most fragrant form, purchase this plant when in bloom and you can make a personal fragrance test.

Wintersweet (*Chimonanthus praecox*)
10-15 feet tall by 8-12 feet wide, full sun, hardy to 0°F.

A large deciduous shrub that bears deliciously fragrant flowers in early spring. A beautiful specimen was in bloom near the Haupt Conservatory of the New York Botanical Garden in February, 1989, following an unusually mild winter. Its early blossoms and intense fragrance attracted much attention. Because this plant is large and undistinguished after flowering it requires a location where it will be seen during the bloom period but where it can recede into the landscape at other times of the year. During severe winter conditions one should expect flower buds to blast or perhaps stems and twigs to die back.

Summersweet (*Clethra alnifolia*)
3-8 feet tall and 3-8 feet wide, full sun to light shade, hardy to −35°F.

In Massachusetts, late summer is the time when summersweet comes into its prime. It occurs as a native plant and inhabits low wet soils ranging in exposure from full sun to moderate shade. In the wild, this plant inhabits moist soils, but in the garden it is perfectly happy in drier acid soils. Flowers are borne in upright terminal panicles and are intensely fragrant. They are typically white, but pale pink selections are available from specialty nurseries. This plant is tolerant of salt spray from roads or maritime locations. It suckers up, forming dense colonies that make superb tall ground covers when massed together.

Sweetfern (*Comptonia peregrina*)
2-4 feet tall and 4-6 feet or more wide, full sun, hardy to −35°F.

This deciduous shrub forms a low mass that spreads slowly by underground stems. In New England, where it is native, it is one of the first plants to invade dry, sunny, inhospitable sites along highways. While it does not have spectacular flowers, fruit, or autumn color, it is distinguished all summer long for its dark, lustrous healthy-looking green foliage. It is the foliage that possesses the fragrance, for when brushed against or crushed it emits a pungent aroma. Because of its toughness and diminutive habit this native shrub deserves wider recognition as a garden plant.

Thorny elaeagnus (*Elaeagnus pungens*)
10-15 feet tall and 10-15 feet wide, full sun to light shade, hardy to 0°F.

A large, robust evergreen shrub valued for green foliage on the typical species, and visually striking variegated foliage on several cultivars. Blossoms appear in the autumn. They are small, tubular, and silvery-white in color. While they are often hidden or lost among the foliage, it is the fragrance of the flowers that attracts attention. The general habit of this plant is somewhat untidy, and as a result, pruning to modify shape may be desirable.

Fothergillas are deciduous shrubs that form multistemmed colonies. They bear unusual stubby bottlebrushlike flowers in early spring. Blossoms are creamy white, fragrant, and last approximately ten to fourteen days. Leaves resemble those on witch hazel plants but are smaller in size and scale. In summer they are medium green, but in autumn they become star performers, displaying foliage in saturated shades of yellow, orange, and bright red, depending on the degree of sunlight available.

Dwarf fothergilla (*Fothergilla gardenii*)
2-3 feet tall and 3-5 feet wide, full sun to light shade, hardy to −20°F.

Large fothergilla (*Fothergilla major*)
6-10 feet tall and 6-10 feet wide, full sun to light shade, hardy to −20°F.

Gardenia (*Gardenia jasminoides*)
4-6 feet tall and 4-6 feet wide, full sun to light shade, hardy to 20°F.

The gardenia we all know as a florist pot plant is hardy out-of-doors in southern states along the Gulf Coast. It is valued for its dense habit, rich glossy foliage, and ivory-white, fragrant blossoms that occur over an extended period of time. It is a bit fastidious about its environment, requiring a moist but well-drained acid soil with protection from winter winds.

Chinese witch hazel (*Hamamelis mollis*)
10-15 feet tall and 15-20 feet wide, full sun to light shade, hardy to 0 to −10°F.

A large deciduous shrub whose bold dark green summer foliage is followed by autumn colors of clear yellow to yellow-orange. Fragrant flowers, which appear in early spring, last for a period of two to three weeks. Individual strap-shaped blossoms are small and bright golden-yellow. The plant is easily grown and dependable for an annual floral show. A cultivar that is just becoming available is 'Pallida', which has a soft yellow flower, rich fragrance, and a spreading crown. One of the hardiest cultivars is 'Brevipetala', a plant with a more upright habit that bears short golden-yellow blossoms.

English lavender (*Lavandula angustifolia*)
1-2 feet tall and 2-3 feet wide, full sun, hardy to −10°F.

An evergreen shrub that is commonly found in the herb garden where it can be grown as a spreading mound or tightly pruned to form a low hedge. The lavender-purple flowers that occur in midsummer are valued for use in sachets. Foliage is gray-green and fragrant.

Osmanthus (*Osmanthus* spp.)
8-25 feet tall, depending on species selected, full sun to moderate shade, hardiness varies from species to species with the most cold-tolerant surviving short periods below 0°F. One exception is *Osmanthus americanus*; a fine specimen of this grows out-of-doors at Spring Grove Cemetery in Cincinnati, Ohio.

Large broadleaved evergreens that bear small, creamy white, fragrant flowers largely hidden among the foliage. The fragrance of *Osmanthus fragrans*, the fragrant tea olive, is rich and powerful, with several blossoms providing enough fragrance to fill a small room. Most species become quite large and can be used in the landscap much as one would use a holly. One way t distinguish *Osmanthus* from holly (*Ilex*) is that the leaves of *Osmanthus* are opposit and those of *Ilex* are alternate. Like *Ilex* *Osmanthus* is adaptable to pruning an shaping.

Mock orange (*Philadelphus* spp.)
Variable in habit according to cultivar bu most are large and 10-12 feet tall with a equal spread, sun to moderate shade, man types are hardy to −20°F.

A deciduous shrub that I value for tolerance to shade, drought, and poor-quality, gravely soils. All forms have a single season of ornamental interest, which is at flowering. Blossoms are white, single to double, and selected cultivars have a rich scent. Fragrant selections include 'Avalanche', 'Conquete', 'Enchantment', 'Fleur de Neige', 'Innocence', 'Miniature Snowflake', 'Minnesota Snowflake', 'Perle Blanche', and 'Virginal', among others. My favorite cultivar is *Philadelphus coronarius* 'Aureus', which in Massachusetts produces a flush of chartreuse green foliage in May. This color fades to a more typical green after six weeks or so. The color transformation is refreshing, for it allows the scene in a garden to change over time. Other cultivars that I find useful for their fragrant flowers and compact habit are 'Avalanche', which attains a height of four feet and arches outward in fountainlike fashion, and 'Miniature Snowflake', which is full and dense and matures at three-to-three-and-a-half feet in height.

Japanese pittosporum (*Pittosporum tobira*)
10-12 feet tall and 10-20 feet wide, full sun to heavy shade, hardy to 30°F.

A dense, compact evergreen that bears small, fragrant, creamy-white flowers that fade to yellow with age. Tolerant of dry, hot locations, salt spray, and severe pruning. Tough and durable. Adapts to a cool greenhouse or atrium location.

Roseshell azalea (*Rhododendron prinophyllum*) (*R. roseum*)
2-10 feet tall with an equal spread, full sun to light shade, hardy to −35°F.

A deciduous azalea that bears bright pink, ragrant flowers in late spring. Summer oliage is bright green, followed by bronze n autumn. Extremely hardy and more tolerant of high pH soils than many ericaceous lants.

Swamp azalea (*Rhododendron viscosum*)
-8 feet tall and 3-6 feet wide, full sun to ight shade, hardy to −35°F.

A deciduous azalea of loose, open habit, spreading slowly by underground stems. Flowers occur in early summer and vary from clear white to pale pink. While this plant normally inhabits low wet soils it is tolerant of drier, more normal, garden conditions. Tough and long-lived, as exhibited by thriving century-old plants at the Arnold Arboretum.

Clove currant (*Ribes odoratum*)
5-7 feet tall and 5-8 feet wide, spreading by underground suckers, full sun, hardy to −20°F.

A medium-sized deciduous shrub of irregular habit and spread. Growth is strong and vigorous. Foliage is bluish-green in summer and reddish-bronze in the autumn. The flowers, which appear in midspring, are small, tubular, yellow, and strongly scented. It should be noted that this plant is an alternative host to a plant disease known as white pine blister rust, and in some locations growth of clove currant is restricted.

Rose (*Rosa* spp.)
Variable in height and spread depending on the selection, full sun, hardiness depends on cultivar selected.

Roses range from miniatures 12-15 inches tall to climbing types that in optimum conditions can grow 20-30 feet tall. They include species that occur in the wild through an innumerable list of cultivars. Some are intensely fragrant while many of the modern teas and floribundas have been developed for size and color rather than for intense fragrance. Why is it that one so often sees roses growing in shade, a habitat completely wrong for successful growth and exuberant flowering? Seek those types of roses that are fragrant, disease resistant, and hardy enough that they will not need winter protection in your area.

Japanese skimmia (*Skimmia japonica*)
3-4 feet tall with an equal spread, full sun to light shade, hardy to 0°F.

This evergreen forms a dense mound of light green foliage. Flowering occurs in midspring on separate male (staminate) and female (pistillate) plants. Flowers on male plants tend to be larger and have a stronger fragrance than those on female plants. In autumn female plants bear showy clusters of bright red, pea-sized fruit. A related species is *Skimmia reevesiana*, which is lower growing, more open in habit, and bisexual—meaning that with only one plant you can expect good fruit set.

Korean spice viburnum (*Viburnum carlesii*)
4-8 feet tall and 4-8 feet wide, full sun, hardy to −20°F.

A deciduous shrub with a full, rounded habit. Flowers appear in early May in the Boston area. Individually small, they are borne in profusion in dense rounded cymes. Buds are pinkish red, opening to flowers of clear white that last 10-14 days. Fragrance is intense. Summer foliage is light green, and in autumn it turns to shades of red and purple. An alternate choice to this species is *Viburnum* x *juddii*, which is a hybrid with *Viburnum carlesii* as one of its parents. Many consider it a superior ornamental because of enhanced disease resistance and greater ease of propagation.

Fragrant Trees

Mimosa (*Albizia julibrissin*)
20-35 feet tall with an equal or greater spread, full sun, hardy to 0 to −10°F.

The plant typically forms a low, broad, spreading canopy. Numerous small leaflets make up the tropical-looking, pinnately compound leaves. Blossoms, small and delicate brushlike clusters that vary in color from light to deep rose-pink, occur in midsummer, in great quantities. Flowers open over a period of several weeks, providing an extended bloom season.

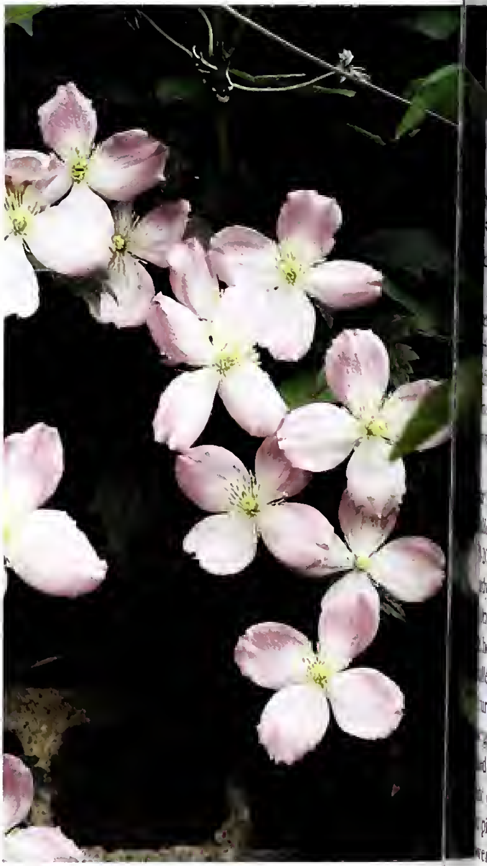
Katsura tree (*Cercidiphyllum japonicum*)
40-80 feet tall with an equal spread, full sun to light shade, hardy to −20°F.

The fragrance of this plant comes not from the flowers but from the senescent foliage in the autumn. Leaves are heart-shaped with scalloped edges, medium green in summer and golden to apricot during the autumn. Fragrance occurs as the leaves turn color and begin to fall away. The odor is sweet, pervades a large area surrounding the plant, and is quite ephemeral, lasting only a week or two.

Russian olive (*Elaeagnus angustifolia*)
12-20 feet tall with an equal spread, full sun, hardy to −40°F

This tree is commonly grown in the upper midwest because of its tolerance to extremely cold temperatures, aerial salts, drought, alkaline soil conditions and wind. Foliage is distinctive for its silvery-gray appearance. Flowers occur in midspring and while small and relatively inconspicuous they do produce a delightful scent.

Clematis montana *is a vigorous vine bearing glossy green and leathery leaves. Flowers are tw or more inches across, white to pink depending upon the cultivar.*



Southern magnolia (*Magnolia grandiflora*)
50-80 feet tall and 30-50 feet wide, full sun, hardy to 0°F.

A grand magnolia, of massive stature, native to the American South. The oval leaves are huge, dark green and glossy. The main flowering period is midspring but occasional flowers are borne all summer long. Blossoms are intensely fragrant, generally eight to twelve inches in diameter. Magnificent, historic specimens of this species flank the south entrance to the White House in Washington, D.C.

Bigleaf magnolia (*Magnolia macrophylla*)
30-40 feet tall and 20-30 feet wide, full sun, hardy to −10°F.

This magnolia bears the largest individual leaves of the genus, measuring one to three feet in length. Because of this size the leaves have a visually coarse texture. Blossoms occur in early summer and are distinctive for their large dimensions. Petals are thick in substance, dull creamy white, eight to fourteen inches across and highly fragrant.

Oyama magnolia (*Magnolia sieboldii*)
15-30 feet tall and 20-40 feet wide, full sun, hardy to −5°F.

In New England, June is the flowering period of this rare magnolia. It produces white cup-shaped blossoms with center tufts of scarlet stamens. Flowering continues for a period of several weeks. Best growth occurs in soils with an acid pH.

Star magnolia (*Magnolia tomentosa*) (*M. stellata*)
10-20 feet tall and 10-15 feet wide, full sun, hardy to −35°F.

One of the most common magnolias in the home landscape. Useful because of its smaller stature and ease of culture. Flowers occur in spring just before the leaves emerge, allowing all blossoms to be appreciated in one view. Colors are typically white but in the cultivar 'Rosea' there is a faint pink color. Because of the earliness of flowering, blossoms are sometimes damaged by frost. Be careful to select a site with an exposure that allows adequate air drainage so cold air will settle at a lower level than the one at which the plants grow.

Clematis paniculata *(sweet autumn clematis) is a deciduous vine that flowers in early autumn producing a multitude of small, white deliciously fragrant flowers.*

Sweetbay magnolia (*Magnolia virginiana*)
20-60 feet tall with an equal spread, with the largest growth potential in southern climates, full sun, hardy to −10°F.

In northern areas this is a small tree, while in the southern part of its range it can become quite sizeable. There are two general forms—one that becomes deciduous in winter months and another known as *australis* that tends to be evergreen or semi-evergreen. The Arnold Arboretum recently introduced a cultivar known as 'Milton' that is fully evergreen in the Boston area. In New England, flowers occur in early June at a time when there is a full complement of foliage. Blossoms are two to three inches across, ivory white, and sweetly fragrant. Flowering occurs over a period of approximately three weeks. This tree grows equally well in wet to dry soils, but the growth habit changes depending on the environment. In dry soils the plant tends to have one or a few stems and in wet soils the plant becomes multistemmed.

Apple (*Malus* spp.)
20-50 feet tall with an equal spread, full sun, hardiness varies depending on the species or type selected.

Apples are common both as orchard trees and as ornamental flowering crabapples. They are widely available, tough, hardy, and easily grown. Flowers occur in mid-May in New England, with all types compressed into a bloom period of about three weeks. Flower colors range from white through pink to reddish pink, and blossoms can be single to double, all depending on the type selected. Fruit can range from one-eighth-inch across to the size of the large apples found in supermarkets. Leaves are typically green, but some forms bear bronze to reddish-purple summer foliage. Many of the older types were highly susceptible to leaf and foliage diseases such as apple scab, cedar apple rust, and powdery mildew. Today, with the desire for low maintenance, it is important to select more disease-resistant forms for the landscape. Many apples tend to be alternate in their flowering and it might be wise to select varieties that are annual in flower and fruit production.

Royal paulownia ((*Paulownia tomentosa*)
40-45 feet tall with an equal spread, full sun, hardy to −10°F.

An example of an introduced tree that has made itself at home, this tree can be found naturalized through areas of the southeastern United States. It is valued for its rapid growth, clear white wood (prized by Asian people for furniture) and lavender blossoms that are an unusual color in north temperate trees. The Chinese plant paulownia because of its deep root system, which allows crops to grow directly up to the base of the tree.

Cherry (*Prunus* spp.)
10-35 feet with an equal spread, full sun, hardiness depends on the variety selected.

Cherries are well-known as garden plants and much loved for their early-seaso flowering—a symbol of the return of spring Flowers vary in color from clear white t rich pink, depending on the type selected and fragrance varies from species to spe cies. Some types produce an edible fruit i early-to-midsummer. Species with fragran flowers include *P. avium*, *P. caroliniana*, *cerasifera*, *P. mahaleb*, *P. mume*, *P. padus*, x *yedoensis*, among others.

Black locust (*Robinia pseudoacacia*)
30-50 feet tall and 20-35 feet wide, full sun hardy to −35°F.

A native plant that is a pioneer, quickl invading disturbed soils and abandone fields. While it can be grown with a singl stem it suckers up and in the wild, tends t form thickets and colonies. *Robinia* is val ued for its ability to inhabit dry, infertil soils. Foliage is dark green in summer an falls away in the autumn without any signif cant color change. The bark of this tree i blackish, deeply ridged, and visually dis tinctive. Pealike flowers, occurring in Ne England in early June, are borne in dens white racemes four to eight inches long.

Sapphire berry (*Symplocos paniculata*)
10-20 feet tall with an equal spread, full su hardy to −20°F.

A small and tough tree. Blossoms occur i mid-May in the Boston area and last f seven to ten days. They are small an creamy white, with a delicate fragrance. I the autumn, fruit, the size of a small pe turns bright turquoise blue and is quickl devoured by birds. Flowering and fruitin occurs in alternate years.

Japanese tree lilac (*Syringa reticulata*)
20-30 feet tall with an equal spread, full su hardy to −35°F.

A small tree that is well-adapted to urba and seacoast environmental conditions well as to heat and drought. Floweri occurs in late spring in large pyramid heads at the end of last season's growth. Th flowers, which are creamy white, are ind vidually quite small, but they are show because of their abundance. Tree lilacs bloom at the same season as roses and can be combined with them to create floral pictures in the landscape. Olfactory perception of the fragrance of this plant varies; some find the odor pleasing, while others do not.

Linden (*Tilia* spp.)
40-80 feet tall and 30-50 feet wide, full sun to light shade, hardy to −20 to −35°F. depending on the type chosen.

Lindens are large forest trees that are often used as street or lawn trees. In youth they tend to form dense, upright ovals, but with age they spread out and open, forming statuesque specimens. As a group they flower in midsummer and bear small yellow-green blossoms heavy with a sweet scent. Lindens make excellent urban trees because of their resistance to environmental pollutants and to hot, dry conditions. One negative is that they are sometimes subject to sooty mold, which causes darkening of midsummer foliage.

Fragrant Vines

Armand clematis (*Clematis armandii*)
Height 5-20 feet or more, full sun, hardy to 20°F.

A vigorous-growing vine bearing beautiful foliage that is glossy green and leathery. Flowers occur in early spring and are two-to-two-and-a-half inches across, white to pale pink, depending on the cultivar selected, and richly fragrant. Flowering occurs on last year's growth.

Anemone clematis (*Clematis montana*)
Height 15-25 feet or more, full sun, hardy to −10°F.

A strong-growing clematis that flowers in midspring. Blossoms are two-and-a-half-to-three inches across, in shades of clear white to pale pink. Flowering occurs on old-season growth. In England this species of clematis is often planted to grow up and through a mature apple tree, clamber over an old evergreen such as a yew or an arborvitae, or thread its way through the canes of a climbing rose.

Sweet autumn clematis (*Clematis paniculata*)
Height 5-20 feet or more, full sun to light shade, hardy to −20°F.

A deciduous vine that flowers in early autumn producing a multitude of small, white, deliciously fragrant flowers. After flowering, seed clusters develop. Green at first, they turn pale beige-brown when ripe and bear delicate hairs that are extremely handsome when backlit by the sun. This plant flowers on new wood, which means that it can be cut to soil level each winter and still flower abundantly in the autumn. Beautiful when draped over a wall. Easier to cultivate than many of the larger-flowered types of clematis.

Common white jasmine (*Jasminum officinale*)
Climbing 15 to 40 feet, full sun, hardy to 10°F.

Deciduous or semievergreen vine. On the typical form flowers are white and appear from midsummer through early fall. In parts of southern Europe a variety, *affine*, whose flowers are tinged with pink and bear broader calyx lobes, is grown to be used in perfumery.

Japanese honeysuckle (*Lonicera japonica*)
Climbing 15 to 30 feet, full sun to moderate shade, hardy to −20°F.

A vine that is deciduous in the north and evergreen in southern areas. This is the honeysuckle vine that spreads like a weed through the woodlands of the mid-Atlantic states, carpeting the ground floor and clambering up the trees. In early summer it produces flowers that emerge white and fade to pale yellow. Blossoms are sweetly fragrant. While individual blooms are short-lived, flowering extends over a period of several weeks. I particularly like the vine for its late retention of foliage, which in Massachusetts turns a nice bronze color in late October and remains on the plant into the harshness of midwinter. This plant is excellent to weave through and mask a chain link fence. Cultivars which I like are 'Halliana', a good vigorous grower and 'Aureo-reticulata', with yellow netted markings through the leaves.

FRAGRANCE IN THE CITY GARDEN

Deborah Peterson

A garden in a city is a very special place: a quiet green oasis in a world of noise, concrete and steel. The owner of a city garden dreams of reading the Sunday papers while relaxing in this tranquil setting. He envisions himself listening to music on a moonlit night, or he makes plans for all the parties he wants to have in his Eden in the city. It is a refuge from the stresses of urban living, and it is richer if it is also a fragrant garden.

In contrast to this rather romantic view, the general public's concept of a urban garden is literally derived from the novel *A Tree Grows in Brooklyn*. To wit: any growth is a miracle. They expect long lists of pollution-sensitive plants and short lists of plants that thrive amid gas fumes and concrete.

The truth is almost everything grows in the city. This author can think of a short list of plants that may be pollution-sensitive—tuberous begonias, fuchsias, achimenes (all hanging basket subjects), some pines, and some overbred roses and rhododendrons. Plants cop with the bad air as well as people. Those tha are frail will be affected and those that ar hearty will not.

The City Garden

City gardens are gardens of extremes, fro sunlit, windswept rooftops and penthouses t shady backyards of townhouses or cavelik balconies along the sides of highrises. Ther are fragrant gardens that will grow in all c these extreme situations. But each individu growing situation must be considered.

The growing conditions on a rooftop a most similar to those found at the seashor high winds, brilliant light, and rapidly draini

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Oxydendrum arboreum *has fragrant panicles of white flowers in early summer that are exceptionally long lasting. Fall foliage color ranges from soft red through bright red to mahogany.*

soil. These factors must be considered when selecting plants. There are many that will thrive under these conditions and others that only tolerate them. If, however, there is a plant that you simply must grow, try it by all means.

The rooftop gardener will have to grow plants in containers. There are many ready-made planters on the market. They must be constructed of an enduring material, such as wood or fiberglass. The best wooden containers are made of redwood, cedar, or treated pressed pine, and fastened together by screws. The planters should have feet so there is a space beneath for air circulation, and there must be drainage holes in the bottom. One of the best ready-made planters is a used whiskey keg cut in half or thirds. Two-thirds of a whiskey keg is ideal for a small tree. Trees and shrubs require a container that has at least a 24-inch diameter. Containers for flowering plants (annuals and perennials) should be at least 18-inches wide and 24-inches deep. Most hardware stores sell potting soil in 60 pound bags that they will deliver to the roof.

The backyard gardener will find conditions that are similar to those in the woods. His garden is shaded by other buildings and protected from wind. Light in the city garden is described as a "wandering ray"—brightly shining on the garden one moment only to retreat behind a building the next, and reappearing in another spot later in the day. Every garden, however, has at least one bright spot. The amount of light in the different areas of the garden will determine the placement of the plants.

Measuring the light is perhaps the most mportant step to be taken. Sun-loving plants, such as tea roses, require a minimum of six hours of sunlight a day. Plants that thrive in partial shade, such as rhododendrons, require at least four hours a day. Even plants that grow in dense shade, such as ferns, need filtered light. To measure your light, keep track of the light in the brightest part of the garden. How long is the sun in that particular area? April/May or September/October are the best months in which to measure the light; they are also the best months for planting. In June, July, and August, when the sun is directly overhead, the readings will be unrealistically high, and conversely, in November, December and February, they will be unrealistically low. The safest plants to choose for the backyard are those that require, or at least tolerate, partial shade.

Unlike the rooftop or terrace gardener, the backyard gardener does not have to import soil. The surface soil is frequently hardpacked and must be broken up with a rototiller or a pick-axe. Add peat and sand to enrich the soil. Our recipe for city soil is: ¼ builders sand, ¼ peat moss to ½ on-site soil. This may seem like hard work, but it is nothing compared to carting 15 cubic yards of loam from the sidewalk through the house to the backyard! The soil you build yourself will be better than any topsoil carted in from the suburbs.

City soil has an unexpected virtue. As you dig around your garden you will find a lot of rubble, from the surface down to two feet. Don't cart it off! All this debris will supply your plants with excellent drainage. To get rid of the surface rubble, dig a big hole, and as you work toss in any bricks and mortar that are lying on the surface. Cover the hole with soil and plant your most finicky plants on top. (Daphnes and rhododendrons love good drainage!)

The balcony gardener works between two extremes. He must grow all plants in containers like the rooftop gardener, but his garden will be almost as shady as that of the backyard gardener because his backyard has a roof.

The urban gardener has one advantage over his suburban counterpart. Cities are microclimates and are frequently ten degrees warmer than the surrounding towns. For example, in New York City the zone is 7 (0 to 10 degrees), and in nearby Westchester, the zone is 5 or 6 (0 to −10 degrees). This small difference in temperature allows the city gardener to grow many plants that could not survive the cold of our nearby suburbs.

If the city gardener takes these factors into consideration, he will find he can grow many plants in his fragrant garden.

Fragrance

Flowers are scented to attract pollinators. Plants that bloom in the early spring or the late fall are frequently heavily scented, as this is when pollinators are few and sluggish. White flowers tend to have more fragrance than brightly colored flowers. The latter attract their pollinators with their flashy colors.

Fragrance is a very elusive and individual quality. What is overpowering to one person will be delightful to another. Some people have a high degree of sensitivity to scent, while others have almost none. The sense of smell is one of the first senses to atrophy, and many older people have diminished ability to detect fragrance. Smoking can also reduce a person's ability to smell.

Plant breeders have done much to lessen the fragrance of plants. As species have been hybridized for bigger blooms, a wider range of color, or extended blooming season, their offspring have lost their parents' scent. Unfortunately scent is one of the first qualities to be lost in hybridization. Roses are an example. Most of the species roses are fragrant and very few of the hybrids are. When selecting the plants for your fragrant garden, take a sniff first.

The list that follows consists of plants that have proved their durability in the city. There are many more, so—experiment.

Fragrant Landscape Plants for the City[1]
Trees and Shrubs

Zone Height

Abelia grandiflora: glossy abelia
6-8 5′

Abelias are delightfully fragrant evergreen shrubs that bloom from midsummer to hard frost. The flowers, borne in clusters, are bell-shaped, white with a blush of pink.
FS/PS WP

Abeliophyllum distichum: white forsythia
4-9 5′

White forsythia is a deciduous March-blooming shrub that takes some time to reach blooming size but is well worth the patience. The fragrant white flowers are borne on arching branches that cascade to the ground making a glorious fountainlike display.
FS/PS WR

Amelanchier: shadbush, serviceberry,
There are two amelanchiers that bloom in early June when the "shad" are running; hence the name. Both are fragrant and have blue berries that attract birds. The flowers are white and borne in small clusters. Colorfu autumn foliage. FS/PS WR

Amelanchier canadensis: shadblow
4-8 60′

This is the largest of the common shadbushes It is found growing wild throughout the East ern U.S. The flowers are single, fragrant, and white, and they appear in June, just before th leaves break out. The autumn foliage is yellow to red, and the shrub has a very attractiv grayish bark, which gives it winter interest.
FS/PS WR

Amelanchier laevis: Allegheny shadbush
5 35′

The Allegheny shadbush is a small, irregula shaped tree that bears masses of fragran white flowers in early spring. FS/PS WR

Chionanthus virginicus:
Virginia fringe tree 3-9 25′
Virginia fringe tree is an extremely delica and graceful multistemmed tree that bea clouds of fragrant white flowers in June, fo lowed by black fruit. It is quite late to leaf ou in the spring and has colorful yellow foliage the fall. FS/PS WP

Cladrastis lutea: yellowwood 4-8 9-30
Yellowwood is a slow-growing tree that bea panicles of one-foot long pendulous flowers. has lovely compound leaves that turn yello in autumn. FS/PS WR

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[1] FS = Full sun, PS = Partial shade; WR = Wind resistant, WP = Wind protection

Corylopsis pauciflora: 5-9 4-5′
Corylopsis is one of the earliest shrubs to bloom in the spring, bearing panicles of creamy-yellow bell-shaped flowers. A wonderful shrub for the shady yard. PS WP

Cytisus praecox: Warminster broom
5-8 6-8′
Warminster broom is an evergreen shrub with long pendulous branches that are covered with creamy-yellow pealike flowers in late spring. It needs full sun and excellent drainage. Broom is an ideal plant for the terrace.
FS WR

Daphnes are among the most fragrant and loveliest of shrubs you can grow. They are a bit tricky, but if you can grow one daphne, you can grow all of them. They require excellent drainage and very good light. The author's greatest successes have been daphnes grown in rubble-filled city gardens.

Daphne x burkwoodii 'Somerset':
6-8 6′
This is a gracefully mounding evergreen shrub that is blanketed with fragrant pink flowers in May. FS/PS WP

D. x burkwoodii 'Carol Mackie':
4-8 6′
This daphne is very similar to the above, but has delicate white margins on the leaves.

D. cneorum: 4-8 9″-10″
Daphne cneorum is a delightful subshrub with needlelike foliage, a spreading habit and may be used in the front of the border or as a ground cover. These little plants are covered with clouds of small fragrant pink blooms in spring and again in the fall. PS WR

D. mezereum: February daphne
4-8 3′
This is the earliest of all the daphnes to bloom. It is a deciduous shrub that has rosy purple lowers that bloom on the old wood. The lowers are followed by bright red berries in une. There is a white variety, *D. mezereum* Alba'.

ranklinia: Franklin tree 5-9 25′
his is a choice deciduous tree that has fragrant white camellialike blooms beginning in August and continuing until frost. The leaves are an attractive bronze red, making a lovely contrast with the large white flowers. It is a native American tree that was found in Georgia in 1790 by John Bartram of Philadelphia. He brought the tree back to Pennsylvania and named it after his friend Ben Franklin. The tree has never been found growing in the wild again. It requires a moist growing situation. PS WP

Hamamelis: witch hazel. The earliest blooming shrubs, frequently blooming as early as February. All have fragrant flowers with ribbonlike petals that unfurl on a warm day and curl up with the cold. All can be grown in sun or partial shade. They are ideal for shady backyards.

Hamamelis x intermedia 'Arnold's Promise':
5-8 20′
'Arnold's Promise' has extra-large primrose-yellow flowers and brilliant orange fall foliage.

H. virginiana: common witch-hazel
5-8 15
This is a fall-blooming witch-hazel. It is the most shade-tolerant.

Illicicum floridanum: Florida anise bush
7-9 15′
The Florida anise bush is a curiosity for the urban garden. It is a native evergreen shrub with long dark aromatic foliage and star-shaped maroon flowers that are borne in mid-spring. The fragrance of the flowers appeals to some and repels others. However, this is a beautiful shrub and a conversation piece.
PS WP

Ligustrum: privet
Perhaps the most overused and under-appreciated of shrubs in the landscape. Were an alien to drop down from outerspace in June, he would find the country blanketed in the heavy sweet aroma of privet and no doubt think the aroma wonderful. Mention privet to anyone else and they yawn.

These large shrubs or small trees are evergreen or nearly evergreen. They are extremely fragrant and will grow in full sun or dense shade, on the tops of mountains, or at the water's edge. They can be pruned to suit any landscape.

Ligustrum amurense: amur privet
4-9 10′
This is a fast-growing shrub with dark green leaves that has large racemes of very fragrant white flowers in June and July. The flowers are followed by attractive clusters of dark blue berries that attract birds. FS/PS WR

L. x ibolium: 4-9 8′
This privet is similar to the above but has dark, glossy green leaves.

L. ovalifolium: California privet.
7-9 15′
The California privet is evergreen and has glossier leaves. It is not as hardy as the others.
FS/PS WR

Lindera benzoin: spice bush 5-8 12′
Spice bush is an excellent native shrub for a shady yard. The small yellow flowers are among the earliest to bloom in spring. The fragrance of the spice bush is in its leaves and twigs. PS WP

Lonicera fragrantissima: winter honeysuckle
6-9 FS/PS
Most of the honeysuckles are vines. This hardy semievergreen tree bears cascades of fragrant white flowers in midspring on old wood. The flowers are followed by attractive red berries.
Magnolias are a large family of trees and shrubs. Some are evergreen, and all bear gorgeous flowers, many of which are very fragrant. FS/PS

Magnolia grandiflora: southern magnolia
7-9 40′
This is a very stately tree that has large glossy green leaves with a handsome brown indumentum on the undersides. The flowers, borne in late spring, are enormous white saucers that have a delicious fragrance. These trees are a bit large for the average city garden, and far too large for a container, but if you have space for a specimen tree, rank this high on your list. FS/PS WR

M. grandiflora 'Little Gem': 6-9 6-10′
'Little Gem' is a wonderful tough little tree that bears fragrant white flowers from April to July and again from September until the heaviest frost. It is slightly smaller than *M. grandiflora* but it has the same glossy foliage with brown undersides. FS/PS WR

M. loebneri: 4-9 25′
This is a lovely deciduous magnolia with fragrant star-shaped flowers that appear before the foliage in early spring. FS/PS WR

M. salicifolia: anise magnolia 6-9 30′
The slender aromatic leaves of this magnolia smell like anise when crushed. The flowers are white, fragrant, and borne in May.
FS WR

Mahonia aquifolium: Oregon grape holly
5-9 3-6′
Oregon grape is a very handsome upright evergreen shrub with large dark green holly-like leaves. In April the plant bears dense clusters of fragrant sulphur-yellow flowers. These are followed by lovely light blue berries. The foliage takes on a beautiful bronze color in winter. PS WP

Mahonia bealei: leatherleaf mahonia
7-9 12′
The leaves of this mahonia are much larger, 12-16″, and darker than the above. It is a stunning foundation plant when mixed with othe evergreens. The April-blooming flowers are more fragrant than those of *M. aquifolium*.
PS WP

Malus (apple and crabapple family) All the crabapples have flowers with a slight fragrance. The ones listed below are the mos fragrant and disease resistant.

M. baccata: Siberian crab 2-8 25′
The Siberian crab is a lovely vigorous tree tha bears clusters of single white flowers in midspring. These are followed by small red fruits
FS WR

M. 'Edna Mullins': white weeping crab
5-8 15′

This is a graceful weeping tree whose boughs are covered with fragrant double-white blossoms in May. The fruits are a light salmon-coral color. It is an excellent container plant for the terrace. FS/PS WR

M. ioensis 'Plena': Bechtel's crab
2-8 25′

Bechtel's crab is a midspring blooming crab with fragrant double pink flowers that look like clusters of roses. FS WR

M. 'Red Jade': 4-8 15′

Red Jade is a superb weeping tree for containers. The branches cascade with fragrant white blossoms in spring and are covered with red fruits that last well into winter.
FS/PS WR

Myrica pensylvanica: bayberry
6′ 2-8

This shrub produces berries from which bayberry candles are made. The spring flowers are insignificant. The foliage and the lovely gray-blue berries are fragrant. They develop along the branches and twigs. Both male and female plants are necessary for the production of berries. Bayberries retain their leaves in their Southern range and during mild winters in the North. FS WR

Myrica cerifera: Southern wax myrtle
7-10 30′

Southern wax myrtle is an evergreen tree closely allied to Northern bayberry. The leaves and the fruits are smaller.
WR

Oxydendrum arboreum: sourwood
4-9 25′

Oxydendrum has small fragrant 8-10″ panicles of white flowers in early summer when few other trees are in bloom. The flowers are exceptionally long-lasting and remain on the tree into the fall. It has lovely red autumn foliage. FS/PS WP

Pieris japonica: Japanese andromeda
5-9 4-8′

This attractive broad-leaved evergreen makes wonderful foundation plants. *Pieris* is sometimes called the 'lily-of-the-valley' shrub because of its pendulous clusters of fragrant white bell-shaped flowers. There are many cultivars in the red tones.
PS WP

Poncirus trifoliata: hardy orange
6-9 20′

This is a genuine citrus tree for Northern gardens. The small orange fruits are not edible, but the April-blooming flowers are just as fragrant as those of its Southern counterparts. The thorns are two inches long and quite vicious. It can be pruned to a low hedge. This is a very interesting and under-utilized plant.
FS WP

Prunus: The cherries. Like the crabapples, most cherry flowers have some fragrance if you sniff long enough. The ones listed below have notable fragrance and are disease resistant.

Prunus avium 'Plena' 3-8 30-40′

This is one of the hardiest cherries available. In mid-spring it is covered with fragrant double white flowers. It has handsome yellow autumn foliage. FS WR

P.x cistena: purple-leaved sand cherry
3-8 8′

The sand cherry has unique purple foliage that makes this an outstanding specimen whether it is in bloom or not. The flowers, white flushed with pink, bloom in late spring.
FS WR

P. laurocerasus: cherry laurel 6-9 3-4′

This is a wonderful evergreen shrub that produces racemes of creamy white flowers in the late spring. Flowers are followed by tiny black cherries. This European cherry has been popular since Colonial times. PS/PS WP

P. padus: European bird cherry
3-8 45′

Lovely fragrant white racemes cover this tree in early May. FS WR

P. subhirtella 'Autumnalis': autumn flowering cherry
5-8 15′

Do not be misled by the name; this tree has only a few flowers in autumn; the main flush of bloom is in midspring. It is a particularly lovely tree with long pendulous branches covered with almond-scented white-pink flowers. It makes a stunning terrace specimen.
FS/PS WR

Raphiolepis indica: Indian hawthorn
8-10 5′
Indian hawthorn is a delightful spring-blooming evergreen shrub for warm climates or very protected sites in the North. The pink flowers are borne in small panicles. FS/PS WR

Raphiolepis umbellata: Yeddo-hawthorn
7-9 6′

The Yeddo-hawthorn is a hardier variety of the above, but the flowers are white.

Rhododendrons and azaleas: All azaleas are rhododendrons. That is the only secure statement that can be made about this very large group of deciduous and broad-leaved evergreen shrubs. A weak rule of thumb: "The small-leaved deciduous rhododendrons are called azaleas". As with all such rules, there are many exceptions.

Of the typical broad-leaved (large leaved) evergreen rhododendrons there are species that are faintly fragrant:

Rhododendron fortunei: 6-9 5′
The rosy-lilac flowers are borne in late May and are moderately fragrant. PS WP

R. scintillans: 5-8 5′
Lovely clear pink tresses adorn this shrub in late May. PS WP

The following are deciduous small-leaved rhododendrons usually referred to as azaleas. Many are very fragrant, and most have lovely orange-yellow-red autumn foliage. All can grow in full sun or partial shade and all are wind resistant.

R. arborescens: sweet azalea 5-8 8-20′
Lovely white flowers fill the air with a heliotrope scent in June and July.

R. austrinum: Florida flame azalea
7-9 8-10′

An American native that bears exceptionall fragrant orange-yellow flowers in May.

R. schlippenbachii: royal azalea
5-8 5′

This azalea has very unusual foliage, almos round with a roughened texture. The foliag turns a lovely red in autumn. The flowers which bloom in May, are soft pink and slightl fragrant.

R. viscosum: Swamp azalea 4-8 8
This lovely fragrant native bears small whit flowers in June and July. FS/PS WR

Rhus aromatica: Fragrant sumac 3-8 3′
The graceful yellow flowers of this small tre have no fragrance, but the foliage is very aromatic. The flowers are followed by large conical red fruits that stay on the shrub all winte Sumacs have brilliant autumn foliage.
FS WR

Sarcococca hookeriana var. *humilis*: swee box 6-9 1′
Sweet box is a charming glossy-leaved evergreen subshrub that has fragrant white flower in spring, followed by long-lasting blue fruits If tacked down it can be trained as a groun cover. PS WP

Styrax obassia: fragrant snowball
6-9 30′

S. obassia is the only fragrant member of thi genus. The white flowers are borne in terminal racemes six-to-eight-inches long in June This is a slow-growing tree that can tolerate moderate amount of shade. FS/PS WP

Syringa: lilacs. Not all lilacs are fragrant, chec before you purchase. They bloom at th height of spring in mid-May. They are, however, prone to mildew (a powdery fungus tha forms on the leaves in mid-summer). Th mildew doesn't seem to hurt the trees, but i doesn't enhance their appearance.

Syringa patula 'Miss Kim': 4-8 5′
'Miss Kim' is an ideal lilac for the smaller cit garden. The pink flowers that bloom tw weeks after the standard lilacs change fron light pink to ice blue as they mature.
FS/PS WR

S. persica: Persian lilac 5-8 8′
The graceful arching branches of Persian lilac make it an attractive plant year-round. It is stunning when it is covered with panicles of pale lavender flowers. FS WR

S. vulgaris: common lilac 4-8 15′
This is our lovely native lilac of "by the dooryard blooms" fame. In May it has lavender flowers that are deliciously fragrant.

Viburnums are truly shrubs for all seasons. In the spring they are covered with masses of white flowers, many of which are fragrant. In the summer their crisp green foliage adds a touch of coolness to the garden and in autumn, becomes a blaze of color. Many develop attractive red or black berries that remain on the shrubs through the bitterest months of winter.

V. x carlcephalum: fragrant snowball
5-9 8′
The snowball viburnum blooms in May with rounded clusters of white flowers. It has excellent autumn foliage, but no berries.
FS/PS WR

V. x bodnantense: Bodnant viburnum
6-8 10′
The sweet-scented flowers have rich red buds that open to white with a pink flush. Bodant viburnum is the earliest blooming of the viburnums; the flowers may open as early as February in a mild winter. It has lovely autumn foliage.

V. x juddii: 4-8 7′
This is a very ornamental viburnum with waxy fragrant flowers that are borne in May and followed by black fruits. It has a spreading habit of growth.

V. x burkwoodii: 6-8 10′
In the South this viburnum is evergreen. It flowers in April with lovely pink buds opening to white flowers that are very fragrant. The autumn foliage is purple and the fruits are red-purple. FS/PS WR

Vitex agnus-castus 'Latifolia': chaste tree
8-15 7-10′
Vitex is a gorgeous small tree whose flowers, foliage and wood are fragrant. The tall blue racemes appear in late summer when little else is in flower. The foliage is silver-gray and palmate. It is lovely when underplanted with late-blooming pale yellow daylilies.
FSW R

Fragrant Ground Covers

Zone Height Light

Arctostaphylos uva-ursi: bearberry
3-8 4-6″
A charming native evergreen ground cover with small shiny leaves. It is covered with small pink flowers in mid-spring.
FS

Convallaria majalis: lily-of-the-valley
3-9 8″
A deciduous ground cover whose very fragrant bell-like blossoms are used in perfume. These carefree little plants bloom in June.
S

Dianthus: border pinks 3-8 6-12″
These little plants form tufted mounds of silvery, evergreen foliage. The small carnationlike flowers bloom from late spring until early fall. Not all members of this family are scented. The following have fragrance: *D.* 'Aqua,' single white; *D.* 'Essex Witch,' double pink; 'Her Majesty,' double white; & 'Old Spice,' double salmon.

Galium odoratum: sweet woodruff
4-8 8″
Both the leaves and the flowers of this deciduous plant are fragrant. The flowers, which bloom in May and June, are white. These are lovely soft plants that will grow almost anywhere. They spread rapidly but are not invasive.

PS

Hosta: 3-10 18″
These large plants fill in along shady paths or under trees. Only two of the species are truly fragrant: *Hosta plantaginea* and one of its hybrids, *H.* 'Royal Standard'. Both bear bell-

shaped white flowers that are held high above the foliage on three-foot stems.

S

Pachysandra terminalis: Japanese spurge

4-8 8″

The very toughest of all fragrant ground covers, it will grow anywhere, spreads rapidly, and blooms profusely in spring with small white fragrant flowers.

S

Phlox subulata: moss pinks

2-9 6″

These are wonderful little evergreen plants for the front of the border. The foliage is needlelike and forms tidy spreading mounds. In the spring they are covered with small fragrant star-shaped flowers. They are available in red, pink, white and blue.

FS

Thymus serpyllum: mother of thyme

3-9 2″

Perhaps the most elegant of all the fragrant ground covers. The evergreen foliage hugs the ground and is sturdy enough for limited foot traffic. It looks wonderful between stepping stones. In late May the little plants begin to bloom with tiny fragrant flowers that last until fall.

FS

Fragrant Roses for the City

There are three classes of roses that do very well in the City. *Rosa rugosa* roses and their hybrids can take the intense light, high winds, and semiarid conditions of the rooftop. Musk roses and their hybrids do well in the filtered light of the shady garden. Shrub and grandiflora roses need a bit more light than the musk roses, but can flourish in the sunniest section of a garden or do very well in the rugged conditions of the rooftop. Tea, Damask, and Bourbon roses tend to be a bit frail for city conditions. The list that follows is based on personal experience; there are many more roses that could be added to it.

	Color	Height	Type
Shrub Roses:			
‘Angel Face’	Lavender	5′	Floribunda
One of the few true lavender flowers in the rose family. They are double, extremely fragrant, and repeat throughout the season.			
‘Harrison’s Yellow’:	Yellow	10′	Musk PS
Double yellow flowers with a wonderful spicy fragrance cover this gorgeous rose in early May. One-time bloomer.			
‘Iceberg’:	White	4′	Shrub S
An everblooming shrub rose with a heavenly fragrance. The author has picked buds from this rose in January.			
‘Betty Prior’	Pink	4′	Shrub PS
Lovely, slightly fragrant single pink flowers that are borne from May to frost. A very durable rose for the city.			
Ramblers, climbers & pillar Roses:			
‘Don Juan’	Red	12′	Climber PS
Stunning dark-velvety double-red fragrant flowers make this an eye-catching rose. Repeat bloomer.			
‘Kathleen’:	White	7-15′	Musk PS
Single blue-white flowers and pink buds seem to sparkle all season long on this dainty climber.			
‘Pink Pillar’:	Pink	8′	Brownell S
Lovely double pink blooms with a very distinctive citrus fragrance are borne all seaso long on this sturdy rambler.			
Rugosa roses:			
‘Agnes’	Yellow	6′	Shrub FS
The only yellow rose in the rugosa famil Small double yellow fragrant flowers cover th plant in June; a smattering of blooms durin the rest of the season. Somewhat tangy fragrance.			
‘Alba’:	White	4′	Shrub FS
Lovely single white flowers develop simul			

taneously with large red hips all season long. The hips remain on the plant well into winter.

'Frau Dagmar Hartopp':
Pink 3′ Shrub PS
A very heavy name for a delightfully fragrant dainty pink rose. The pink flowers are borne simultaneously with the longlasting red hips throughout the season.

'Hansa': Red Purple 5′ Shrub FS

The double red-purple flowers have the distinct fragrance of cloves. A repeat bloomer that develops dark red hips.

Miniature Roses

Tough is the last word you would ever use to describe these delicate little plants, but tough they are! They can be grown in all parts of the country, and they withstand tremendous heat and cold. They do not require as much sun as standard roses, which makes them excellent candidates for backyard and balcony gardens, and they can take all the wind and intense sun of the penthouse and rooftop garden. They are all nonstop bloomers from May to December. There are hundreds of these little roses on the market now. Those listed below are the most fragrant ones in the author's collection.

R. 'Jean Kenneally' is larger than the other miniature roses and forms a dense little shrub 30″ by 30″. The flowers are a lovely shade of apricot.
R. 'Jennifer' is double light pink shrub-type rose. 15-18″
R. 'Julie Ann' is a hybrid tea with double vermilion flowers. 12-14″
R. 'Summer Butter' has pale yellow flat double flowers. 14-18″
R. 'Sachet' is a double damask-type rose with pale lilac blooms. 24″

Fragrant Vines

Zone Height

Actinidia species: These species offer lovely fragrant flowers and delicious fruit. All are very vigorous and require sturdy trellises. Male and female plants are required for fruit.

A. arguta: 4-8 100′
The leaves are soft green with red petioles. The fruits are one inch in diameter and very sweet. It is said one vine can yield 100 pounds of fruit a year.
S-PS WR

A. chinensis: 7-8 100′
This is the kiwi of commerce whose oval fuzzy fruit is sold year-round in grocery stores. The leaves are heart-shaped and slightly fuzzy. They are hardy to New York City.
S-PS WP

A. kolomikta: 3-8 100′
The leaves of this kiwi are tri-colored—pink, green, and white. It is extremely hardy. The fruits are similar to those of *A. arguta.*
S-PS WP

Clematis maximowicziana: 3-9 30′
The fragrance of sweet autumn clematis can perfume the whole neighborhood in the month of August. The flowers are small and star shaped and are followed by fluffy seed heads.
S-PS WP

Gelsemium sempervirens: 7-9 20′
Double Carolina jessamine is a vigorous evergreen vine which is covered with one-inch fragrant yellow flowers in spring and summer.
S-PS WR

Hydrangea anomala petiolaris:
5-9 60′
The climbing hydrangea is one of the most elegant vines you can grow. The fragrant white flowers are borne in flat clusters that are six inches long. It climbs on arbors and walls without support. However, its clinging tentacles can damage wood. Rather slow to get started but well worth the wait.
S-PS WR
S-PS WP

Lonicera: honeysuckle
There are many species of these very fragrant, albeit aggressive vines. All are hardy from zones 5-9, can attain a height of 10-15′ and will

Oxydendrum arboreum, *sorrel tree, has small fragrant panicles of white flowers that remain on the tree into fall complementing the lovely red foliage that ranges from soft red through bright red to mahogany.*

perform best in full sun, but can take some shade. All are wind resistant.

L. heckrottii: (golden flame honeysuckle) pink outside, creamy yellow inside.

L. japonica 'Halliana': (Hall's honeysuckle Creamy flowers all summer.

L. henryi: The long dark green foliage persist all winter even in the coldest areas. The lovel creamy flowers are followed by black fruit.

Wisteria species: These are lovely fragran vines that are closely associated with the olde sections of cities. The long ropy trunks scramble up sides of brownstones and cascade ove iron fences. Their fragrance is delicate and th long pendulous racemes of blue or whit flowers look lovely against bricks an brownstones.

These are very vigorous vines and all hav the potential to reach well over 100 feet. A require a sunny position for maximum bloom They can be grown in zones 4-9.

Unfortunately, they can be quite destructive. They can very easily take down telephone wires and become entangled in othe structures. Very old vines have quite a bit dead wood and can become fire hazard should a spark from a chimney land in then

W. sinensis: (Chinese wisteria) Lovely fragrant pendulous blue flowers in May and agai in August.

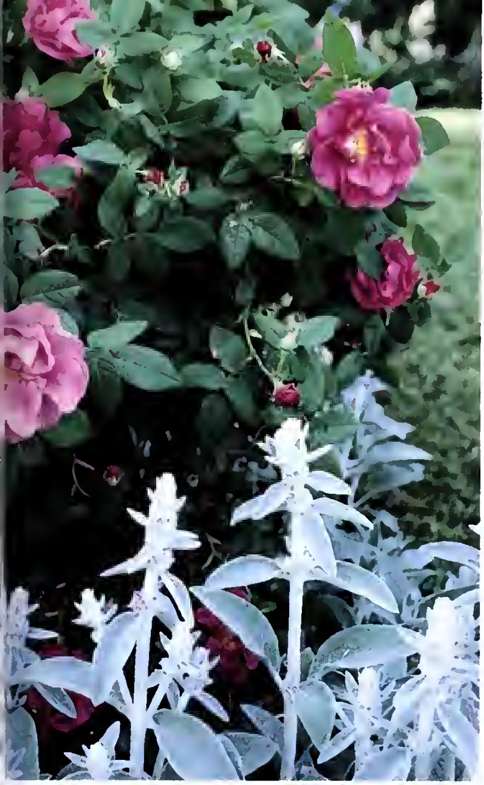
W. floribunda: (Japanese wisteria) The love pendulous lilac flower-clusters have bee measured at two-and-one-half feet long.

W. floribunda 'Ivory Tower': A cultivar of *floribunda* that has pure white flowers ar was discovered on the Princeton campus.

The Fragrant Old Roses

Page Dickey

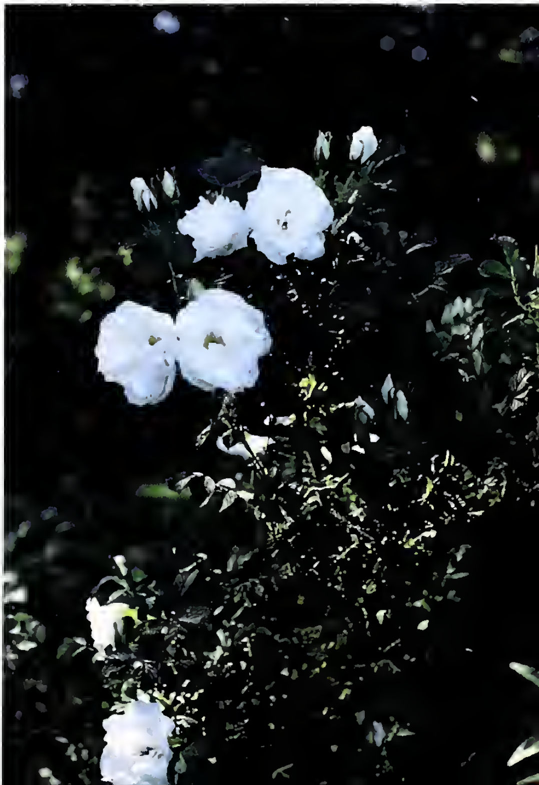
For a glorious month, from late May to the end of June, my garden (55 miles north of New York City) is heady with the fragrance and lavish bloom of the old shrub roses. These roses are planted in a variety of garden beds where they combine charmingly with perennials, herbs, bulbs and ground covers. When not in bloom, they add structure to the gardens without casting too much shade, allowing flowers to weave through and beneath their branches.



Photos by Page Dickey

> *". . . in the hardy borders, among the Irises, Sweet Williams, Peonies, Sweet-scented Valerian and Canterbury Bells, [the old-fashioned Rose] has a very distinct place and lends to any garden an abiding charm and sweetness that cannot but be a delight to its possessor."*
>
> *Louise Beebe Wilder*
>
> Adventures in a Suburban Garden, 1931

Top: Apothecary's rose, Rosa gallica officinalis, *was esteemed for its scent and its medicinal properties in the Middle Ages. The flowers are brilliant light crimson, semidouble with yellow stamens.*



'Blanc Double de Coubert' is a rugosa rose that blooms in May. The flowers are loosely double and are complemented by the handsome, glossy, deep green foliage.

Page Dickey gardens in northern Westchester County, New York, where she lives with family and assorted farm animals. She is currently writing a book about her life there.

The display starts quietly in the middle of May with the lovely old-fashioned yellow roses. The fern-leaved 'Father Hugo' *(Rosa hugonis)* opens sprays of butter-yellow single flowers on delicate arching twigs. Its sport, *Rosa cantabrigiensis,* is a treasure in my garden. (I have only seen it one other place — at Sissinghurst some years ago.) Its flowers are a paler yellow, luminous really, on a slender shrub that is sweetly scented. The hybrid rugosa 'Agnes' blooms now, soft yellow double flowers that are deliciously fragrant. It makes a tall shrub eventually and has dark green crinkly rugosa foliage.

By the end of May, two other rugosa roses are in full bloom in my garden and fill the air with their fragrance. Bushes of 'Blanc Double de Coubert' (four to five feet high) are planted in the corners of my small patterned white garden. Their papery chalk-white flowers (loosely double) are handsome against glossy deep-green ribbed leaves. After the first great flush of bloom, one can expect an occasional flower through September. The rugged foliage stays good-looking all summer and in October turns a pleasing yellow. In the herb garden surrounded by lamb's-ears and lady's mantle, 'Frau Dagmar Hartopp' opens large simple flowers of silvery-pink, with a center of yellow stamens. By late summer, if I haven't deadheaded the faded flowers, this small (three feet) bush is covered with wonderful hips, the size and color of cherry tomatoes. The rugosas seem to be disease-free; even the persistent Japanese beetles find their glossy leaves unpalatable.

I love to bury my nose in the first early blooms of the hybrid burnet rose, 'Stanwell Perpetual'. It is a four foot arching shrub, very prickly, with small ferny leaves and ruffled blush-pink flowers of intense old rose sweetness. Gertrude Jekyll (in *Roses for English Gardens*) recommends planting it in clumps of three, but my one bush looks graceful enough against a low stone wall where it is underplanted with mounds of pale pink *Geranium sanguineum* var. *prostratum.* It is a fountain of bloom in early June and continues to flower lightly until frost.

By the second week in June, the garden is a riot of rose bloom, and much time is spent wandering around the borders drinking in this extravagance of flower and fragrance. Damasks and albas, gallicas and centifolias, portlands and moss roses tumble about stands of foxgloves and campanulas, bushes of southernwood and rue, carpets of *Nepeta,* lamb's-ears and pinks.

I think the albas are my favorites. They make lovely graceful bushes (five or six feet in height, four or five feet wide) with arching branches of fresh blue-green foliage. Like most of the old roses, they have only one stretch of flowering, but with good shape and leaves, they stay a pleasing background all summer. And their blossoms! Pink to white, ruffled and swirled, sweetly, delightfully fragrant. 'Céleste' (or 'Celestial') is at the top of the list with enchanting flowers of pale pink somewhere between single and double. Here, bushes of 'Céleste' thrive in a half-shaded border with white and blue peachbells *(Campanula persicifolia),* yellow daylilies and soft-pink *Geranium macrorrhizum.* 'Maiden's Blush' is another five foot beauty, with blush-pink double flowers, a favorite cottage flower for centuries. In his classic book on old roses, Graham Stuart Thomas says "to me there is no rose scent so pure and refreshingly delicious as that of the 'Maiden's Blush'." 'Queen of Denmark' ('Konigin von Danemark') is similar but with deeper pink flowers that remind me of swirled strawberry ice cream. It jostles for space in my garden between the dwarf Korean lilac and bushes of *Baptisia,* and is underplanted with clumps of rue and coralbells. 'Félicité Parmentier' is a narrower shrub with smaller swirled blooms of the palest pink, fading to white. It mixes prettily with spotted foxgloves and the milky-blue bells of *Campanula lactiflora* in one of my sunny borders.

The large globular blooms of the centifolia, or 'Cabbage' rose, are familiar to us in Dutch and French floral art of past centuries. A common cottage plant in Gertrude Jekyll's day, she wrote "no rose surpasses it in excellence of scent; it stands alone as the sweetest of all its kind, as the type of the true rose smell." 'Fantin Latour' is a tall arching centifolia, remarkably thornless, that becomes a fountain of romantic blooms. The drooping flowers are large and packed with petals, a medium-to-pale pink, richly fragrant. Measuring five feet by five feet, it is a good rose for the corner of a garden bed. Next to 'Fantin Latour' in my flower border and often intertwined with it is the 'Common Moss' *(R. centifolia* 'Muscosa') a sport of the centifolia, beloved by the Victorians. It is a tall gaunt shrub with blooms that are similar to 'Fantin Latour' in fragrance and shape, but has fuzzy or mossy sepals that enfold its buds and frame its flowers. A posy of moss roses with some sprigs of southernwood and apple mint is a memorable treat. Three other centifolias grow in my garden. 'Petite de Hollande' is a small shrub (three feet) with charming miniature cabbage blooms that are clear pink and sweetly fragrant. 'Rose de Meaux', equally small and scented, has tiny pink pompom blooms. Dean Hole, the Victorian rosarian, calls them "the pony roses" of his childhood. The lovely buds are valued for potpourri. The third rose, 'Striped Moss', is a rather wayward shrub with small appealing flowers that are striped crimson and pale pink, framed with the telltale mossy sepals.

The ancient damask roses, softly colored and intensely fragrant, have always been cherished as a source for attar of roses, rose water and potpourri. Perhaps the most famous damask today is the beautiful 'Madame Hardy'. It is a stout five-foot bush literally covered with small white doubleblooms that open flat, swirled and quartered around a curious green button eye. The flowers are unique and sumptuous. The foliage is bright green, alas, appealing to Japanese beetles, and often looks ratty later in the season. I mask this with Michaelmas daisies, summer phlox and the late-blooming *Hosta* 'Honeybells'. Earlier, magenta-pink *Geranium sanguineum* and cheerful yellow evening primroses complement the white roses. 'Celsiana' is a favorite damask in my herb garden—very feminine ruffled pink blooms on a slight arching four-foot shrub with downy light-green leaves. It has an exquisite fragrance. The venerable 'Autumn Damask' ('Quatre Saisons', *R. damascena bifera),* which repeats its flowering into October, is one of the most fragrant of all. Although the bush is somewhat scraggly, I prize the sweet loosely double flowers of clear pink and collect them carefully in baskets to dry for potpourri.

Similar in shape and scent to the damasks, the 19th century portland roses delight us with a second flush of flowering in late summer that is equal to, if not lovelier than, their first. Not growing as tall or as wide as most of the old shrub roses, they are ideal for the small garden. 'Comte de Chambord' makes a neat four foot by three foot shrub at the entrance to my garden. It has rich pink double flowers, deeply scented, that are born singly and are closely framed with large green leaves. Graham Stuart Thomas describes this portland characteristic as the "high shouldered" look. Smaller in stature with flowers a lighter pink, 'Jacques Cartier' is another portland treasure with a heady fragrance. Two bushes of this sweet rose stand across from 'Comte de Chambord', underplanted with lady's mantle and interwoven with regal lilies.

The gallica roses are the oldest of all the shrub roses and encompass some of the liveliest colors in their flowers. They tend to be compact bushes, almost thornless, with dark green leaves flowering only once in June for two or three weeks. The flowers have a light delicious fragrance that intensifies when dried and, consequently, the petals are prized for potpourri. The 'Apothecary's Rose' *(R. gallica officinalis)* was esteemed not only for its scent but for medicinal properties in the Middle Ages. On a low (three foot) spreading bush, masses of large, brilliant light crimson flowers, semidouble with yellow stamens, make a gorgeous display. Its sport, 'Rosa Mundi' *(R. gallica versicolor)* is the best of the striped roses. The same large semidouble petals are splashed and ribboned with white and deep pink. Both these striking roses grow in my herb garden, where they are surrounded by the soft foliage of wormwood, lamb's-ears and southernwood, bordered with thyme and spicy pinks. 'Tuscany Superb' is a stunning gallica with semidouble flowers of the deepest velvet crimson, showing golden stamens. It makes a fine picture underplanted with white and green variegated hosta (*H.* 'Thomas Hogg') and pale pink astilbes. The gallica 'Charles de Mills', with wonderfully swirled flowers of rich crimson-purple, is a conversation piece in my garden, tangling with the blush-pink climber 'New Dawn' and fronds of dark green tansy. 'Belle de Crécy' is a slight shrub with curious gallica blooms of blue-pink fading to mauve and gray. It grows here in a tangle with 'Madame Hardy' and another striped gallica 'Camaieux' which has stunning small double flowers. They open blush-white striped with light crimson, change to purple-crimson and fade to pale lilac and white.

The great Victorian shrub roses, the bourbons and hybrid perpetuals, are not always reliably hardy for me (Zone 5), but it is well worth taking the chance and growing a few of them. 'La Reine Victoria' and its sport 'Madame Pierre Oger' are tall narrow shrubs with charming cupped blooms, very round and double, the former a rich silky pink, its offspring pale, pale pink tinged with rose. Both are elegant flowers, sweetly scented, offered throughout the season. A favorite hybrid perpetual that is hardy in my garden is 'Baronne Prévost'. It is a good-sized shrub (four to five feet) with large handsome flowers of deep rose-pink, very double, opening flat and quartered with a button eye. It is richly scented. 'Reine des Violettes' is usually listed as a hybrid perpetual, but in habit and flower resembles the older shrub roses. It makes a large arching bush in my garden with almost thornless canes well-furnished with gray-green leaves. There is nothing quite like the color of its fragrant flowers. From a red-purple bud, the flower expands flat and swirled to a beautiful soft violet. Blooming quietly through the summer, 'Reine des Violettes' makes a lovely picture grown with pale yellow daylilies, white summer phlox and billows of *Artemisia* 'Silver King'. Peter Beales says in his *Classic Roses,* "If I had to choose just one hybrid perpetual, it would have to be this one."

There are many excellent modern shrub roses popular now — 'The Fairy', 'Seafoam' and 'Bonica' come to mind — that offer a profusion of bloom throughout the summer and have some of the grace of the old roses. But they are missing what is, for me, a key ingredient — that intoxicating, deeply satisfying old rose scent. To thrill the nose as well as the eye, return to the romantic old shrub roses. ❧

Some Sources for Old Shrub Roses

Roses of Yesterday and Today
Browns Valley Road, Watsonville, California 95076-0398
Pickering Nurseries Inc.
670 Kingston Road, Pickering, Ontario LIV IA6
Wayside Gardens
1 Garden Lane, Hodges, South Carolina 29695-0001
White Flower Farm
Litchfield, Connecticut 06759-0050
Claire's Nursery (not mail-order)
Haviland Hollow Road, Patterson, New York 12563

A source for all old roses in commerce can be found in the *Combined Rose List,* 1989, combined by and available from Beverly R. Dobson, 215 Harriman Road, Irvington, New York 10533 $11.50.

Bev Dobson's Rose Letter, published every other month. Same address. Subscriptions, $9.00 a year.

Fragrant Trees, Shrubs and Vines

Jerry Sedenko

The larger features of a landscape, the trees, shrubs and vines, are used for their architectural value. They give mass, substance and line to a garden. Aside from their forms and leaf and branch texture, fall foliage and flowers are also considerations for choosing such plants. But why choose a plant on a purely visual basis? One that gives fragrance adds a whole new dimension of enjoyment to the garden.

There are basically two sources of fragrance in any plant, blossoms being the most obvious. But leaves can also offer pleasant aromas, usually of a more resinous nature. Many foliage fragrances are only released when the leaves are bruised or brushed against. These are most effective near pathways and other areas of coming and going.

Even with flowers, scent is not always "free on the air." Most roses need to have a nose inserted before the fragrance is apparent. Yet no one objects. That's part of the experience of a rose. Other plants perfume the air around them for yards, and it is best to consider prevailing wind direction when siting these, so as to take full advantage of the situation. Some are fragrant only on warm days, some perfume the night air, and others release their aromas after a rain. With the lack of insect pollinators in the cold winter and early spring months, many plants that bloom at that season try to make themselves particularly attractive by being very powerfully fragrant.

Jerry Sedenko is a horticulturist and garden designer who lives and gardens in Seattle. He is an active member of the Northwest Perennial Alliance and the Hardy Plant Society. His articles appear in many gardening magazines.

Wisterias are generous with their fragrance when in bloom. This one blooms in May in the northwest.

The sense of smell is extremely subjective. Some fragrances can be delightful to some, but annoying to others. A cloying sweetness, a piercing sharpness, or a fetid aroma are all generally considered to be unpleasant, so the list I have prepared attempts to steer clear of such fragrances. However, bear in mind that some fragrances, like night-blooming jasmine, can be delightful at ten paces, but are nauseatingly sweet at two feet.

My list is also confined to plants that are generally available to a gardener without too much trouble. Therefore, sources for many of these things are listed at the end.

Trees With Fragrant Flowers

Acacia baileyana, dealbata, smalli, often called mimosa, particularly in the florist trade. These, the hardiest members of the Australian section of this genus, are widely planted where adapted. In February, the feathery gray leaves are bespangled with clusters of half-inch primrose pompoms, with a cinnamon scent that carries well on the breeze. Even when not in bloom, these fast-growing trees are very decorative, and prefer it on the dry side when established. Hardy in Zone 9, iffy, but worth trying, with shelter, in Zone 8.

Caragana arborescens, Siberian pea shrub. Can grow quickly to tree size, about 20 feet. Ultra hardy, and very fast growing, if somewhat rank. Used in shelter belts in the Midwest. Lots of sweetly scented flowers in midsummer. Sort of a large-scale Scotch broom. Zone 2, or colder.

Citrus spp. Lemons, oranges, calamondins. Superb ornamentals, even if you don't live in Florida. The Orangery was a standard feature of any grand garden in the 18th and 19th centuries, wherein potted lemons and oranges would be moved for the winter. In the garden for the summer, the intermittent waves of white blossom perfume the air for a great distance. Small-growing Meyer lemon, calamondin, otaheite oranges, and kumquats are ideal for this treatment, and can make quite a centerpiece for an herb or rose garden. As a bonus, the leaves are fragrant when bruised, and can add a citrus flavor to food. Zone 9.

Cytisus battandieri, Atlas broom. A small tree with silvery compound leaves. In June, three-inch terminal clusters of light yellow flowers, scented of pineapple, adorn the branches. Prefers cooler summer areas, such as the Pacific Northwest. Hardy to Zone 7.

Elaeagnus angustifolia, Russian olive. Gorgeous silver-leaved tree with dramatically contrasting black bark for just about anywhere. Naturalized along watercourses in desert areas of the Great Basin and Columbia Plateau. Barely significant pale yellow flowers in early summer perfume a wide area. If you can't find a weeping silver-leaved pear to emulate Sissinghurst, this is just as fetching and a lot less trouble and expense. Zone 3, at least.

Magnolia spp. Our own *M. grandiflora* and *M. virginiana* are beautifully adapted to warm summer areas and their many cultivars, including *M.g.* 'Little Gem' (suitable for containers), ensure that just about anybody can grow one of these evergreen sorts. Their creamy white flowers scented of tea with lemon stud the dark green foliage intermittently from late spring to fall. Of the deciduous types the Asian *M. campbellii, M. sieboldii,* and *M. sprengeri* are probably the best. Ivory and rose flowers, eight to ten inches across, cover the bare branches in early spring. They can take a long time to reach blooming size, but are doubtless worth the wait. Zone 7, but flower buds can be damaged by late cold spells.

Pittosporum undulatum, Victoria box. Another fast-growing Australian for frost-free locales. The evergreen three-inch leaves have rippled edges. Masses of white flowers, aging ivory, are borne periodically throughout the year. A light but rich scent, redolent of lemon peel, that carries well. And since they endure coastal conditions, there can be plenty of breeze to waft the scent. Zone 9.

Prunus spp. Plums and apricots. The musky-sweet scent is one of the first of the year. Fruiting plums, particularly of Japanese or American origin, also have the scent. *P. cerasifera, P.* x *blireiana* and other purple-leaved sorts are popular members of the group. *P. mume* from Japan is the first to bloom, often in January. The dozens of varieties grown in that country should find their way here eventually. Non-fruiting plums hardy to Zone 6, various fruiting plums hardy to Zone 1.

Robinia pseudoacacia, Black locust. Tall, rather unrefined trees with delicate compound pea foliage drip with clusters of wonderfully sweet white or pink flowers, reminiscent of *Wisteria.* Not for a formal garden, as they send up suckers from the roots. Try them in dry, rough areas particularly in the country in a no-nonsense grove. The roots fix nitrogen and the blossoms can be made into fritters. Varieties to be sought out (some, hybrids with magenta-flowering *R. viscosa*) are 'Idahoensis' and 'Decaisneana' with rose pink flowers, 'Pyramidalis' and 'Frisia' with chartreuse leaves, and 'Purple Robe' with purplish flowers and bronze new growth. Zone 3.

Styrax obassia, Fragrant snowbell. Sophisticated deciduous tree to 30 feet, with large rounded leaves. In June six-inch clusters of small white flowers hang from near the ends of branches. Good against an evergreen backdrop. Not always easy to find. Zone 5.

Tilia spp. Linden. Our native American linden, *T. americana,* has yellowish flowers, whereas *T. cordata* and *T.* x *euchlora* have whiter flowers. All are very sweetly scented and, dried, make a wonderful tea conjuring up images of June. Wonderful street and shade trees being quite tolerant of city pollution, but not noteworthy for autumn color. The American will do nicely in Zone 2, the others, in Zone 3.

Trees With Fragrant Foliage

Calocedrus decurrens, Incense cedar. Conifer native to mountains from Oregon to Baja California and widely adaptable. Flattened foliage like a *Thuja* (arborvitae) giving a sweet, resinous scent on warm days. Tolerant of poor soil and drought. Can be slow at first, but then fast to 70 feet. Zone 3.

Other conifers — *Thuja, Pinus, Juniperus, Cupressus.* Myriad varieties for all zones. Most release their scent, to varying degrees, when the weather is warm. All are fragrant when brushed against.

Eucalyptus spp. Australian gum. Australian genus of about 500 species, 150 of which have been grown from Arizona to British Columbia. Nearly all have some aromatic quality, the most noteworthy being *E. citriodora,* lemon-scented gum, *E. globulus,* blue gum (the most common), and *E. pulchella,* white peppermint gum. Zone 9. *E. gunnii* and *E. niphophila* are hardier to Zone 8.

Laurus nobilis, Grecian laurel. Broadleaved evergreen from which is obtained bay leaves. Dense and slow to 40 feet. Needs good drainage. Does well in pots anywhere. Small flowers in early summer are a sweet-scented bonus. Zone 8. Similar *Umbellularia californica* (California bay laurel, pepperwood, Oregon myrtle) has stronger scent. Zone 7 with some shelter.

Populus spp. Cottonwood, poplar, aspen. In spring, when the new leaves unfurl, they are coated with a sticky resin that has an unmistakable resinous, woodsy scent which carries for large distances. *P. balsamifera,* Balm of Gilead, is particularly good. These are "weed" trees, fast-growing but short-lived, and with horrible surface roots that sucker all over the place. But they're indispensable for country properties near ponds and streams or along lanes. One kind or another will grow in all zones.

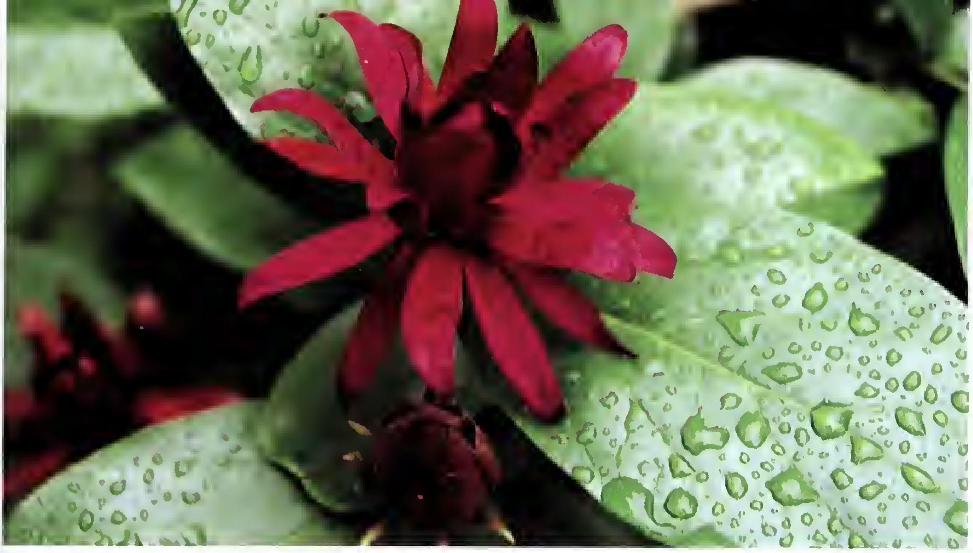
Shrubs With Fragrant Flowers

From January to March not too much is doing in the garden, and we are particularly grateful for any signs of vitality. How gratifying that some of the sweetest fragrances appear at this time. Deciduous shrubs with similar requirements are witch hazel *(Hamamelis)* with yellow to orange fringe blossoms, Wintersweet *(Chimonanthus praecox)* bearing pale yellow waxen flowers, and winter hazel *(Corylopsis)* also with pale yellow flowers, but in hanging chains. All are rather slow growing, with open structure, and prefer a somewhat acid soil in a sheltered spot, to protect buds from cold snaps. Also of similar needs are *Viburnum* x *bodnantense* 'Dawn' and *Lonicera fragrantissima* (winter honeysuckle) with sparse clusters of rosy pink and white flowers respectively. Zone 7. *Mahonia bealei* and *M. japonica* are similar exotic-looking relatives of our Oregon grape, bearing shiny evergreen leaves that give them the look of a holly crossed with a palm tree. At the top of each stem are clusters of yellow flowers with a lily-of-the-valley scent. Zone 5. The sweet boxes *(Sarcococca* spp.) are all similarly unassuming dark green willowy broadleaved evergreens. *S. hookerana* var. *humilis* is a dwarf, wonderful for edging pathways, to about 18″. The others are all taller, to around three feet. The flowers are barely significant, but oh so fragrant. Particularly effective near entryways. Zone 7. A taller shrub, nearly a tree, is *Azara microphylla,* with a profusion of small fuzzy-looking white flowers scented of vanilla. Its graceful form and evergreen leaves are best displayed against a sheltering wall. Zone 8. As a group, the daphnes are some of the most fragrant of shrubs. The first to bloom is the rather gaunt *D. mezereum,* February daphne. Rosy purple or white flowers on leafless stems are followed by red or yellow berries. Zone 5. A bit later *D. odora* opens its rose-pink buds arranged in nosegays at the tips of its branches. The crystalline white flowers release a heady scent for yards around. Zone 7. Still later *D. cneorum,* rock daphne, smothers its neat, low-growing tuffets with deep pink flowers. Zone 7. In late spring, and intermittently thereafter, *D.* x *burkwoodii* 'Somerset' flowers along wandlike branches. Zone 5. Both *D. odora* and *D.* x *burkwoodii* have forms with white-edged leaves.

A bit later, in mid-spring, the Mexican orange *(Choisya ternata)* blooms. Bright, glossy evergreen leaves composed of three leaflets look top-notch year-round. And the masses of white flowers make a very clean appearance. The flowers have a delicate citrus fragrance, while the leaves have a sharp, but not unpleasant pungency. At about the same time, *Osmanthus delavayi* and x *Osmarea burkwoodii* come into bloom. They are quite similar, the latter being more or less a larger scale version of the former. Hordes of small white flowers, deliciously sweet, clothe the branches. The dark green, lustrous leaves are very handsome, and they both make wonderful hedges clipped or not. Zone 7. Another relative, *Osmanthus heterophyllus,* has hollylike leaves, but not so prickly. It blooms in the fall, filling the air with a gardenia scent. There are several varieties, some with variegated or purple leaves. Zone 5.

Another spring-blooming broadleaved evergreen creates mixed reactions in people. For some the romance of the Scottish Highlands is conjured up by Gorse *(Ulex europaeus).*

Buddleias are rank growers but if cut back in spring will produce a vigorous fountain of long blossom-tipped wands. Butterflies love them.



Calycanthus occidentalis, *spicebush, has four-inch leaves that smell of allspice and ginger. The flowers resemble narrow-petalled two-inch water lilies.*

Since a yellow pea flower or two can usually be found throughout the year, the saying arose that "when gorse is out of bloom, then kissing's out of fashion." During the main flush, the branches are wreathed in sweet blossoms, and it is quite a sight. But, in truth, there is hardly a spinier plant on earth, which makes it ideal for barrier plantings, but not much fun to garden around. Best left to rough places where it can mind itself. A double form also exists. Zone 6.

The genus *Rhododendron* contains a few fragrant members. Several eastern native species, such as *R. viscosum* (swamp azalea, Zone 4), *R. arborescens* (sweet azalea, Zone 5), and *R. prinophyllum* (roseshell azalea, Zone 3) offer delightful perfume. On the West Coast is *R. occidentale,* Zone 7. These and the Exbury and Mollis hybrids are all deciduous and all fragrant. Autumn foliage on some is exceptional. The evergreen cultivar 'Fragrantissimum' bears large blush-white flowers. Its lax habit makes it ideal for spilling over a wall or training as an espalier in Zone 9, or in a container elsewhere.

Other pea family members with fragrant yellow flowers are *Cytisus canariensis,* naturalized in coastal California, and *Spartium junceum,* Spanish broom. The former is less hardy, to about Zone 8, but flowers in mid-spring. Spanish broom gives a strong textural effect with its brushlike green nearly leafless branches. It also has the largest flowers of any of the brooms and one of the most pleasing perfumes. Zone 7.

The undisputed queen of spring-flowering shrubs is the lilac, *Syringa vulgaris.* There are dozens of varieties with single and double flowers from white through darkest purple. There's even a creamy-yellow variety called 'Primrose'. Some of the best are 'Charles Joly' (double red-violet), 'Ludwig Spaeth' (single dark purple), 'President Lincoln' (single wedgwood blue), and 'Sensation' (single wine red with white picotee edge). Not only are they hardy as can be, but they actually need cold to bloom well. Therefore, the Descanso hybrids were developed for warm-winter areas. The best known of these is 'Lavender Lady'. Unfortunately, once out of bloom, the shrubs have little to recommend them. Try encouraging a clematis or other vine to twine through. There are many other *Syringa* species, and hybrids derived from them, and, while beautiful to look at, most have a weedy smell, similar to the closely related privet.

Next in the seasonal procession are the mock oranges *(Philadelphus* spp.). We are willing to forgive their rather untidy growth for the sake of the ambrosial blossoms. Most bear white flowers, but 'Belle Etoile' has a rosy center. There are also doubles and dwarfs, and one with yellow foliage. Zone 2.

Now it's rose season. There are dozens of modern varieties with fragrant flowers, with names like 'Perfume Delight' and 'Fragrant Cloud', and these are not to be sneered at. But for a more useful form in the landscape, many of the older shrub roses are better, and even more fragrant. The hybrid rugosas are some of the sturdiest roses imaginable. They range in color from deep red-violet through pink to white, with 'Agnes' a lovely pale yellow. Their fragrance is nearly identical to the wild roses of ditches and hedgerows across America, and conjures up memories of country ramblings. As a testament to their durability, rugosas have naturalized on the dunes of Cape Cod. Another rose that has "gone wild," in some places to the point of pestiferousness, is *Rosa multiflora.* Left to its own devices, it becomes a billowing mound festooned with thousands of blush white-to-pink one-inch blossoms. With the aid of a tree to clamber in, or even a chain-link fence, it will hoist itself up to waft its fragrance far and wide. This is one of the few roses whose scent is "free on the air." And is it ever. It's a sweet, ladies' cosmetic sort of fragrance, reminding me of my mother's cold cream. Another sprawly shrub, excellent for training on a fence or wall, is the bright pink, thornless 'Zephirine Drouhin' also with very free scent. Much the same can be said of 'Sombreuil' which possesses the most unique flowers; creamy-white with a suggestion of palest flesh, its many petals looking as if someone sheared them off, flat, with a knife. The ancient apothecary's rose *(R. gallica)* has the distinction of actually having scented petals, so it is ideal for potpourri. And don't overlook the pink and rose striped version, 'Rosa Mundi'. 'Mme. Isaac Pereire' is regarded by many as the most fragrant of all old roses, but other candidates include the purple 'Charles de Mills', 'La France' (the first hybrid tea), 'Fantin Latour', 'Konigin von Danemark', 'Stanwell Perpetual', and 'Gruss an Aachen', the first floribunda. Some, but not all, of the hybrid musks possess a delicious fragrance, one of the best being 'Buff Beauty'. And a modern rose, 'The Yeoman' (one of the "English Roses" created by David Austin in the older style), is redolent of that most elusive of rose scents, myrrh.

Rosa eglanteria, the sweetbriar, or Shakespeare's "Eglantine", bears single scentless flowers, but the foliage is fragrant of green apples particularly after a rain. So site this one where the prevailing south stormwinds will send its sweetness your way. In addition to having generally very fragrant flowers, the characteristic foliar protuberances that give moss roses their name possess scent glands. The scent is sweetly resinous and quite different from the blossoms.

Midsummer brings terminal clusters of small creamy flowers redolent of tea-with-lemon to *Pittosporum tobira* and its dwarf, cushion-forming variety, 'Wheeleri'. This broadleaved evergreen from Australia is hardy to Zone 8. Both standard and dwarf forms have variegated variants.

The many varieties of *Buddleia* bloom for weeks at this season. The nickname of summer lilac is appropriate both to the color range and the form of the inflorescence. Most widely adaptable are the tough-as-nails varieties of *Buddleia davidii* and its smaller counterpart, *B. davidii nanhoensis.* The latter's varieties are often marketed as 'Petite Plum' and 'Petite Indigo'. Other sorts, often hybrids with other species, are *B. fallowiana* varieties, and 'Lochinch', all with lovely gray leaves. All are rank growers, and if not cut back nearly to the ground annually in spring, make twiggy, coarse growth. But if this simple trick is practiced, a vigorous fountain of long blossom-tipped wands is produced, with clouds of gaudy butterflies hovering about; hence, the other common name of butterfly bush. Zone 4, at least.

Sweetpepper bush *(Clethra alnifolia)* is an August bloomer that prefers a damp site. Three-inch clusters of sparkling white blossoms waft their scent from the tips of the branches, and the pink flowered forms are to be sought out. Zone 3.

Shrubs With Fragrant Foliage

Many shrubs have leaves that reveal their fragrance when either sun-warmed or brushed against. Rosemary and sage are two shrubs usually grown specifically for their fragrant leaves. Their many forms, both of stature and leaf color, warrant their use as ornamentals. Most are generally hardy to Zone 5, if good drainage and nutrient-poor soil are assured.

The spicebushes *(Calycanthus floridus* and *C. occidentalis)* have four-inch leaves redolent of allspice and ginger. The flowers are rather like narrow-petalled two-inch maroon waterlilies, having the substance of wood shavings. They have their own fragrance, often likened to strawberries. Zone 5.

In warmer areas hedges are often made of myrtle *(Myrtus communis)* as it is a very undemanding fine-textured plant that takes well to shearing. In colder areas it is often used for topiary accents in pots to be moved indoors for the winter. The fragrance is powerfully resinous, conjuring images of Italian formal gardens. Zone 8.

Cistus ladanifer and its hybrids proffer one of the most delightfully sweet fragrances on warm summer days. One looks about to see which flower is so fragrant, only to realize it's the dark green leaves of this rockrose. The common name derives from the two-inch white flowers, often with a ruby-red spot at the base of each petal. Individual crinkled-crepe blossoms are fleeting, but are borne in masses over a long season. Poor, dry soil assures hardiness to Zone 8.

Fragrant Vines

Much has been made of late of the kiwi vines, *Actinidia* spp., for their fruiting virtues. *A. arguta* bears its gooseberry-size fruit to at least Zone 4. Its relative, *A. kolomikta,* equally hardy, is a sought-after ornamental grown for its masses of velvety leaves, tipped with white and bright pink. But both of these have deliciously fragrant flowers, particularly towards evening. Plant them near a bedroom window or terrace to take full advantage of this quality. But beware — cats can ravage a newly planted vine in a frenzy induced by the plant, much as with catnip.

The clematis tribe contains some fragrant-lowered members. The showers of straw-yellow bells of *C. rehderiana,* Zone 5, and the foaming white masses of *C. dioscoreifolia,* Zone 6, scent the air of summer and early autumn. In Zone 7, the evergreen *C. armandii* fills the air with orange blossom scent in early spring. There are white and pale pink flowered versions. Some clones of *C. montana* have a decided vanilla aroma, but this varies from plant to plant.

Some of the honeysuckles are noxious weeds in certain parts of the country. *Lonicera japonica* can get out of hand, but where it behaves, its all-summer perfume is a delight. Making more of a visual impact is *L. periclymenum* and its varieties and hybrids. The rose or scarlet and cream-yellow flowers are borne in great profuse clusters. Zone 3.

The jasmines are the quintessential fragrant vines. *Jasminum sambac, J. polyanthum,* and *J. nitidum* are, alas, for Zone 9. But poet's jasmine, *J. officinale* and its pink-flowered hybrid *J.* x *stephanense* will grow, with summer heat and winter protection, in Zone 7. *J. polyanthum* also makes a delightful hanging basket subject for a cool greenhouse, blooming in February. Of a similar nature, Confederate jasmine, *Trachelospermum jasminoides* is commonly used as a ground cover, but will climb modestly. It's scent can be a bit on the cloying side. Zone 8, with shelter.

Many of the climbing sports of modern bedding roses are rather stiff things, bearing their blossoms in a manner more appropriate to the shrubs from which they arose. Their flowers are often both sparse and non-recurrent, and can have the perplexing habit of facing up, which is fine for the sparrows, but not so good for mere mortals looking from below. However, many of the older roses have gracefully nodding flowers, perched in a fashion that not only lets us see the flowers, but invite a good, deep sniff. 'Etoile de Hollande', 'Lady Forteviot'. and 'La France' are sports of older hybrid teas that possess charm as well as the required fragrance. 'Belle Portugaise' and 'Dr. W. van Fleet' will clothe the ugliest of buildings with huge masses of flowers. The generous 'Doctor' has an even more generous sport, 'New Dawn', identical in every way except for the fact that its trusses of lovely pink flowers are borne all season–particularly lovely with one of the Dutch honeysuckles. The white form of *Rosa banksiae* has a scent of violets, very early in the season, but is rather tender, chancy even in Zone 8. *R. soulieana,* however is hardy to at least Zone 3, and its incredible profusion of white flowers fills the air with a honey scent. Several lax-growing ramblers derived from *R. arvensis* were developed in Scotland, and bear the generic name Ayrshire Ramblers. Their two-inch loosely double flowers festoon remarkably healthy and vigorous vinelike canes, even in nearly full shade — wonderful for covering old eyesores, or for adding another dimension to rhododendron grottoes. 'Ayrshire Splendens' is an available variety, and it is sweetly fragrant.

The wisterias are as generous with their scent as they are of blossom. The shorter-clustered *W. sinensis* and *W. venusta* varieties, as well as the elegant, ethereal three-foot clusters of *W. floribunda* all perfume the air deliciously. Zone 4.

Several lesser-known plants offer alternatives to this list of tried-and-true vines. *Anredera cordifolia,* Madeira vine, forms tubers that can be dug and stored over winter in cold areas. The main requirement for production of its foot-long, white flower clusters is heat.

Chilean jasmine, *Mandevilla laxa,* is an all-too-rarely-seen gem hardy to Zone 7. Clusters of two-inch white gardenia-scented trumpets are borne most of the summer.

The passion vines all bear exotic or bizarre flowers, and at least one of them, *Passiflora alatocaerulea,* adds fragrance to the effect. The orange egg-shaped fruit is both ornamental and edible. Zone 7.

In sub-tropical regions, *Stephanotis floribunda* bears its waxen white bells, which most of us only see in bridal bouquets. It can also be grown to great effect in a warm greenhouse.

A native-American member of the pea family, *Apios americana,* is valued mostly for its freely produced edible tubers, which, historically, helped sustain many a Pilgrim forefather. However, the clusters of rosy blossoms are also very fragrant, reminiscent of violets. Zone 3.

And no list of vines would be complete without that other member of Leguminosae, the sweet pea. Although an annual, with coaxing it can reach ten feet or more. The range of colors is wonderful, as is the profligacy of bloom. A cool summer area and very frequent picking of blooms are best for ensuring a long season of sweetness. ❧

Sources

Roses of Yesterday and Today
802 Brown's Valley Rd.
Watsonville, CA. 95076

Forestfarm
990 Tetheral Rd.
Williams, OR. 97544
A wonderful assortment of woody things, some quite unusual.

Lamb Nursery
E. 101 Sharp Ave.
Spokane, WA. 99202
Mostly perennials, but vines and shrubs, too.

Wayside Gardens
Hodges, SC 29695
Large listing of first-class plants of all descriptions.

Pickering Nurseries, Inc.
670 Kingston Rd.
Pickering, Ontario, LIV 1A6
Canada
Extensive list of all types of roses. Catalog $2.

Fragrant Houseplants

Lorraine Kiefer

Candles, potpourri, and simmer pots can all add fragrance to a room. My favorite way, however, is the natural way — with a window full of fragrant plants.

If you have a window that receives a few hours of sunlight a day, you can grow one or more of the fragrant plants that will bloom indoors. Fragrant plants bring a new dimension to a windowsill of green plants. A fresh, springlike fragrance is a joy on a snowy day! Some plants such as the sweet olive (*Osmanthus fragrans*) are very easy to grow and bloom most of the year. Others, such as paperwhite narcissus or hyacinth, have a much shorter time of bloom, but are intensely fragrant and colorful.

There are many types of fragrant plants from which to choose. Before deciding which plants are for you, consider these factors. First, approximate the hours of sunlight at each window in which you could place the plants. Also determine which areas are cool and which are near heat sources. Many fragrant plants need a cool place in order to bloom. Others, like jasmine, need a warm, humid area, often found in a laundry room, kitchen, or shower area. Very few will flourish in a dry, warm spot, but I have found that a hoya bloomed riotously in a west window near a fireplace. One warning: some folks find that a blooming hoya is really too sweet in a small room.

Hybrid lilies are a real challenge for indoor gardeners. 'Casa Blanca' has large spectacular flowers that are very fragrant.

Photos by Lorraine Kiefer

There are a few common sense rules to follow for success with most plants, including the fragrant ones. I have found that all need fresh air and fairly cool temperatures, especially at night. Good light is important, but there are certain plants that will adjust to less light and still flower. A good, well-drained potting soil such as Pro Mix is safe and easy to use. Most houseplant fertilizers are fine when used as directed or even diluted a little bit more than recommended. I usually stop feeding all my plants at Halloween and don't start again until the New Year; during the dark days of December the plants don't need as much food, although a plant in active bloom in strong sun will benefit from half-strength fertilizer once during this period.

It is important to find the right spot for each fragrant plant. I can grow fragrant olive everywhere in my house where there is a window, including places that only get a brief kiss of morning sunlight. On the other hand, jasmine is much more selective.

Lorraine Kiefer and her husband Ted own and operate Triple Oaks Nursery and Florist in Franklinville, New Jersey. Her special interests are herbs, fragrant plants, wildflowers, and perennials. Lorraine writes garden columns for the Franklin Twp. Sentinel *and* Jersey Woman, *and she is a frequent contributor to the* Green Scene.

Jasmine *(Jasminum sambac)*, a native of India, is a wonderfully fragrant vine that needs a warm, sunny spot when grown indoors. It will take partial shade while outdoors for the summer. It loves humidity, which can be created by pans of pebbles filled with water under plants in sunny bay windows. Grow the jasmine in a hanging basket above the other plants and keep it cut back and fed so it looks healthy and bushy. A stringy-looking jasmine probably needs trimming, food, and more light. A summer outdoors will usually remedy any health problem.

There are many types of jasmine. Most require the kind of care outlined above, but some may bloom more readily than others. I feel that if I am going to have a hanging basket or a vine, it might as well be a jasmine. It is really worth growing jasmines because of their delightful fragrance.

Another vine that is both beautiful and fragrant is the passiflora or passion flower. Some varieties are more fragrant than others, and all have wonderful flowers. I first saw the plant many years ago, while honeymooning in Bermuda where there is a passion flower perfume factory. Since then I have grown many of these lovely plants successfully, both on a porch in the summer and in a sunny bay window in winter. They do best in hanging pots unless you are willing to trellis them or allow the vines to climb around a window. They will only flower when it is warm, but can tolerate cool temperatures during their winter rest period. I find that cutting my plants back during the winter encourages good growth and blooming in the late spring, summer and fall. Don't hesitate to prune these vines anytime if they look lanky. Like other heavy-blooming tropicals, they can be fed weekly from March to October with a mild liquid fertilizer.

Another great family of fragrant plants is the citrus, including the lemon, orange, lime, and grapefruit. All can be obtained in a dwarf form, and they grow very well in most cool homes. I have grown them all in almost all of my windows. They do well as long as it's not too hot and dry; citrus drop their leaves in rooms where there are woodstoves or fireplaces. A summer outdoors usually revives these plants, especially if they are well watered. They will grow in sun or light shade when outdoors, feed twice a month. If the plants are outdoors in the summer, natural pollination can take place, and they will produce colorful fruit. The flowers bloom for a very long season and at times are so numerous they actually make a mess when the petals drop. I find their wonderful, old-fashioned fragrance well worth the trouble of sweeping up a few petals. Many times my trees have had both blooms and fruit at the same time, making them both colorful and fragrant.

A fairly unusual plant, *Clerodendrum fragrans*, is bushy, with roselike flowers borne in large double white clusters. Like many blooming plants, these plants need good light, but not direct sun. Pinch back all the time, and cut back drastically in February since blossoms only occur on new growth. These plants need a lot of water during the blooming season, but they also need good drainage.

Another real challenge, but one that I have had great success with, is the *Stephanotis*. This is a wonderful climber with sweetly scented, waxy white flowers. Called the wedding flower by many, this plant blooms with large clusters of blossoms if kept in a warm sunny spot. In the winter I like to keep my plant in a western bay window in my dining room where it has lots of moisture from other plants and sun all day. The vine often has to be cut back to keep it from tangling with the hanging jasmines. In the summer this plan goes on the porch, right next to my front door where it gets morning sun only, and lots o moisture. I was thrilled when clusters of fra grant blooms appeared to greet all who came to my door.

Although more popular, the gardenia is no as easy to grow as the sweet olive and jasmine The gardenia that is commonly found in the home is *G. jasminoides*, named because of it jasminelike scent. Gardenias require coo nights and sunny days — the more sun, th more flowers. If the plant has less than fou hours of sunlight, it will probably not for buds. Although the gardenia can tolerate hot days, night temperatures must not go over 60 degrees if it is to set buds. It also needs constant moisture and high humidity. A tray or dish of pebbles, such as those used in fish tanks, can be placed under the plant and kept full of water. In addition, gardenias need a lot of acid, and they will become yellow if the pH is too alkaline. Remember the grandmothers who poured left-over tea into the gardenias? They were unknowingly lowering the pH. Summer them outdoors, especially during the humid days. Buds that set during the cool evenings of spring will swell in the humidity and bloom.

If you have a hard time getting a gardenia to bloom, there is a gardenia relative that is a lot easier to grow, although it is a bit more difficult to locate — African gardenia *Mitriostigma axillare*. The blooms are arbutus shaped and fragrant.

Some of the plants grown outside in temperate regions can be grown as houseplants in the north. Sometimes it is difficult to locate these plants, but they can be found. One I especially like is the *Daphne odora*, a shrub with fragrant pink flowers that can be grown in a cool window.

Many of the fragrant plants that you might want to include in your indoor garden do not have conspicuous flowers. Some, such as the scented geranium, are grown for the fragrance of their leaves rather than their flowers. One that is not exciting looking has very fragrant leaves, patchouli (*Pogostemon patchouli*). This plant provides oil for one of the oldest known perfumes, and in ancient times linen from India was scented with patchouli. Place in a very warm spot and provide lots of water. I have had good luck growing it in my western exposure bay window. The plant responds to the lightest touch by releasing its heady, rather mysterious fragrance. Since ancient times its leaves have been harvested, dried, and packed in bales for export to places that make oil of patchouli.

One of my favorite fragrant plants is rosemary. It is not easy to grow indoors if the house is warm and dry, but rosemary will flourish in unheated sunrooms, window-well gardens, and very cool bay windows. Although rosemary prefers well-drained soil when grown outdoors, it is wise to flush water through its soil often when it is grown indoors. It is also important to give the plant lots of sun or the fragrance will not be as strong and the growth will be weak. My plants flourish in an unheated plant room that has sunlight all day and cool temperatures at night. They are especially beautiful during the winter when they bloom. Shakespeare said, "Rosemary for remembrance." Once you've touched this marvelous plant and enjoyed its unique odor, you'll never forget it! It is often used for cooking, bathing, potpourri, and decorations.

Some plants like the star anise grow as easily as ficus, which they resemble, and they have a great spicy aroma. Star anise becomes a large tree in tropical areas such as Java, but it will adapt to the average house if given fairly good light and water. Indigenous to China and North Victnam, it has long been used as a spice in India, but it was not known in Europe until the mid 1500s. In the wild it is usually found in sunny high areas where the soil retains moisture. Although the flowers and pods are not showy, the pods are aromatic and the leaves are very pleasant smelling, as indicated by the name, *Illicium* (which means "that which entices from the very pleasant scent of the tree and fruit").

A houseplant that has fragrant flowers and dainty leaves is common myrtle, *Myrtus communis*. This is a very popular plant in southern Europe, where its leaves are used in cooking, medicines, cosmetics, and wedding decorations.

The plants discussed so far have all been long-lived plants, many of which grow to tree size in their native environments. Another group that can bring wonderful fragrances to the indoors are the many plants grown from bulbs. Most of these have to be planted while dormant and given a cool period to form roots before they will bloom. Some bulbs such as hyacinths and paperwhite narcissus can often be purchased precooled. Once green shoots are showing on any type of bulb plant it is time to move it into strong light where temperatures are cool. Temperatures that are too high will cause weak, lanky growth and poor bloom.

Several types of narcissus and miniature daffodils will delight you with their springlike fragrances and color. Some iris and tulips are also fragrant.

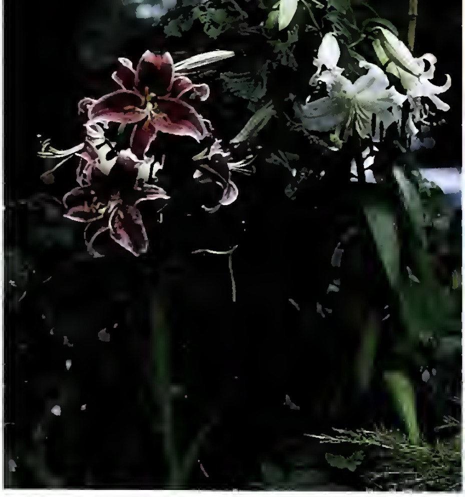
It is a challenge to try the magnificent hybrid lilies. 'Star Gazer' and 'Rubrum' both have showy pink-and-white blooms and are fragrant. The 'Casablanca' lily has much larger and more spectacular flowers that are also fragrant. Pot the bulbs in late fall or very early spring and place in a cool spot. After good roots have formed, move to a cool window, greenhouse window, or plant room.

Freesias can enliven the late winter or early spring window with their fragrance. Not the easiest plants to grow, they should be started in a very cool spot that is above freezing. I usually plant mine between Halloween and Thanksgiving and place them in my hobby greenhouse. Only a shallow container, like a bulb pot, is necessary. I stake the grasslike foliage. Stems will be weak if the light is not good or if there is too much nitrogen in the fertilizer. Remember that these plants need good light in order to produce blooms in 10 to 12 weeks.

Lilies-of-the-valley can be lifted from the garden just before they break through the soil. Place them in an attractive container in moist potting soil. Water well and keep in a cool, bright window until the blooms appear.

Besides the bulbs and shrub-type plants, there are other fragrant plants. One worth mention is the night blooming cereus. My original plant came from a cutting from an elderly couple who had a plant in a pot the size of a bushel basket. I started it and forgot about it. Each summer it went out on the porch, each winter it went wherever there was room. Some years the unsightly plant even went into an attic room where it was often cold and where I usually neglected to water it.

One summer we noticed several very large buds. We watched daily as they seemed to swell with the heat and humidity characteristic of our southern New Jersey Julys. One dusk we noticed the unbelievable fragrance of this bud and realized that it would probably bloom that evening. Soon we had assembled a group of people, including the editor of the small weekly where I write a garden column Chilled white wine and a beautiful summer evening made a great setting for the debut o this fragrant flower. It was worth the wait and truly an unexpected treat. I can best describe the bloom as a huge white tropical bird ready to fly. The fragrance was a potpourri of all the lilies I have ever enjoyed. The next morning i was gone. There were other blooms that summer, and summers to come, but none as large and magnificent as that first.



'Star Gazer' and 'Rubrum' lilies both have showy pink and white blossoms. Pot bulbs in the fall or early spring and place in cool spot. When rooted, move to a cool window.

Another spectacular bloomer with lovely white blooms is the Amazon lily, *Euchari grandiflora.* This handsome green plan resembles other popular tropicals and wi thrive with good moisture and light. I hav found that when my plants are put out under lath roof for the summer and left there unt just before frost they flower profusely in th cold months. They usually start bloomin around Thanksgiving and continue most c the winter. Unlike the bulbs, these plan remain foliage plants most of the time, wit only a brief resting period after bloomin when less water is required.

Some plant varieties are more fragrant than others. The oleander, *Nerium oleander* is an example — it is most fragrant. Given plenty of moisture and sun, with lots of food during the warm months, this one will add fragrance to your patio all summer and then perfume the indoors during the autumn as long as it receives good light.

There are many good books on fragrant plants. You may also want to visit botanical gardens and actually smell these plants, since fragrances often provoke very subjective responses.

Remember that *fragrans, odorata,* and *-osme* in a name usually indicate that the plant has fragrance. Also bear in mind that the amount of light, the temperature, and the amount of fertilizer will all have an effect on the fragrance.

Once the fragrant indoor garden is established it is important to follow certain guidelines. Humidity is very important. No matter where the plants are located, water must be near by. Try adding an attractive garden fountain or a birdbath if space and decor permit. A fish tank helps provide moisture, as well as bowls of water with colorful pebbles.

Frequent baths can help control insects. This takes time, but it is an enjoyable way to "be with" your fragrant plants. I sometimes shower my plants right after I do the dishes, leaving them to drain all night before putting them back in the window. This also allows me time to wipe off the sill and any other areas that could harbor insects.

I use a systemic insecticide in the soil of all the plants that summer outdoors. The systemic, taken into the system of the plant, makes the leaves distasteful and poisonous to insects. I find this treatment safer than sprays, which get all over me and the house as well as the plant. I do use sprays when the insects can be seen, but I take the plant to the porch or garage before spraying. Always follow directions and spread a spoonful of potting soil around the plant to eliminate any odor.

With minimal care, moderate-to-good light and common sense, you can successfully grow most fragrant plants. They will add color, fragrance and a hint of spring to your indoor garden. ❧

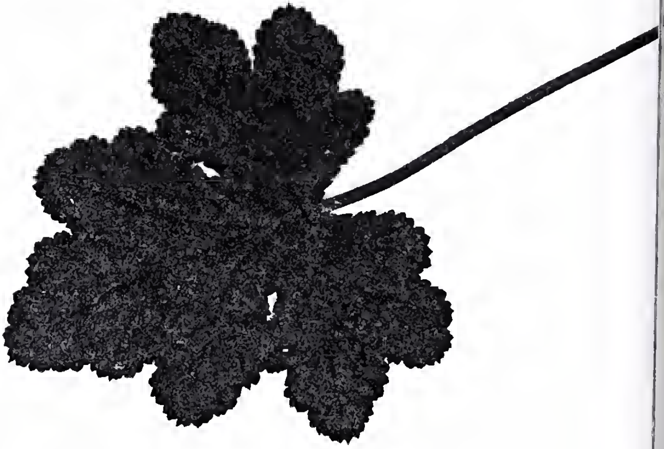
Recommended Reading

The Avant Gardener, 1988, *Horticultural Data Processors,* New York, NY, Vol. 20, No. 11.

Helen Van Pelt Wilson and Leonie Bell, *The Fragrant Year,* M. Barrows & Co., NY, 1967.

Jasmine is a wonderfully fragrant vine that needs a warm, sunny spot when grown indoors. It will grow in partial shade outdoors in summer.

SCENTED GERANIUMS MIMIC PLANTS



Bertha Reppert

Clorinda

Believe it or not, here in cold Zone 6, on my winter windowsill, I can grow a profusion of exotics — ginger, nutmeg, orange, rose, peppermint, apple, cinnamon, pine, apricot and more, much more. It's my scented geranium collection, mimic plants, that come in all these glorious fragrances and flavors.

My first encounter was with a common rose geranium, a slip given by a neighbor that rooted easily in water and then grew like Jack's beanstalk, quickly filling an entire sunny south window. It seems I spent that winter repotting my eager-to-grow houseplant, ruffling its fragrant leaves every time I passed by. As a young bride, flexing new found green thumbs, I found it an amazing acquisition, certainly memorable.

Since then, I have never been without a rose geranium in the garden or on the windowsill. Enthusiastic collecting has added dozens of additional scented geraniums to the collection. I am hooked on the unexpected "hidden virtues" of these tantalizing aromatic plants.

Although everyone calls them geraniums they are properly pelargoniums, denizens o the southern hemisphere that have irregula flowers in two and three petal groups and a adnate nectar tube. Since these ancient plant were first discovered in South Africa in th 17th century and brought to England by botanist John Tradescant, they have been calle "sweet geraniums." And indeed they are in th family Geraniaceae, along with the true geranium species, plants hardy in temperate zones

Within the realm of herbs, the scente geraniums are a specialty unto themselves. N fragrance garden dares to be without its specimen rose or lemon or peppermint geraniun in the beds or as accent plants in large containers.

Amenable to either situation, these hea lovers are especially adaptable to containe culture, making splendid patio plants Grouped in collections of varied leaf forms

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Bertha Reppert, author of A Heritage of Herbs *(Stackpole Books, 1976) owns a herb and spice shop, Rosemary House, in Mechanicsburg, Pennsylvania.*

textures, sizes and appealing scents, they are among the most desirable of potted landscape features, especially on a hot humid summer day when the leaves automatically release their oils into the air.

Given reasonable soil, good drainage and as much sun as possible, scented geraniums reward their growers with everything except flowers. Of course they do flower (and a certain few have spectacular blooms) but they do not produce the great balls of color found on the geraniums commonly used as bedding plants. Although some flowering occurs all year-round, the best bloom is in the garden in summer.

It is not only what you see you get with these lovelies—it's their astonishing fragrance that sets them apart, a built-in aroma released at a touch. Caress them all you like . . . they love to be petted.

Since these natural air refreshers are also edible, they can be enjoyed on the menu as well as for perfume in the air. Parties indoors or out are doubly enhanced by lemon, spice, eucalyptus, coconut, lime, almond, and strawberry to say nothing of assorted pungent fragrances from the many hybrid combinations of all of the above. Helen Van Pelt Wilson writes "The scent of geraniums isn't a subject for logical argument at all, only a cause of delight."

Lady Plymouth

It will amuse your guests to rub the leaves, release the volatile oils, then guess their names. For instance, 'Clorinda' has been described as lemon, nutmeg or eucalyptus scented. I call it spicy. However, discreetly placed labels are helpful aids to learning the "Who's Who" of scented geraniums. I put name tags on all my potted collections, for my benefit as well as for others.

Children are fascinated by these imitators. Given furred peppermint leaves to pet or teeny tiny lemon leaves with their distinctive strong odors, the surprise engenders priceless reactions. The haunting fragrance will linger on their hands for some time.

Planted directly in open soil, most scented geraniums soon grow to enormous proportions. In the Washington D.C. area two feet is not unusual; in California or Florida they easily reach four feet tall and wide. All of the foliage is useful; gather bunches for use indoors, to carry, or to distribute to everyone you know as charming scented nosegays.

Where they are tender, cut back the tops (a harvest to be dried or rooted) and root prune before repotting the plants and returning them to winter quarters indoors. Do this a month or so before you plan to bring them inside. As perennials, they will rest a while before setting forth new growth.

In the sunny south where temperatures do not fall below 20 degrees these tender perennials can be left outside. Willing to tolerate occasional frost, they will easily weather light snows. Under tropical conditions, they become subshrubs.

Although mine never achieve shrub proportions, I enjoy my winter windowsill coterie. It's quite true what they say about "aromatherapy" — they lift my spirits on the dreariest of days. To touch them is to love them.

They reside and perform in every light situation available, including grow lights of any sort. Although they do better in the sunniest window, where they will delight you with flowers, they will endure, though growth will be spindly, in north light. Good drainage and careful watering seem to be their most rigorous demands. Occasional feeding with any good houseplant fertilizer (I use Peters, fish emulsion or Electra) and pinching back weak growth, which can be used for little boutonnieres, will keep them happy.

Careless watering will do in a geranium more quickly than neglect. Since watering is a variable — depending upon the size of the pot, the porosity of the soil, the needs of the plant, and the heat and humidity in the room — it's difficult to give explicit directions.

Feel the soil with your fingers — water when dry. Much of my collection is housed on a large tray of wet pebbles, and, although it is not portable, it holds a good many plants seeking moisture as needed.

I also like to "double pot" larger plants — a clay pot inside an old crock or cachepot with a few styrofoam packing peanuts in the bottom. Indoors these rarely need water more than once a week even in full sun.

Recycle those packing peanuts as excellent drainage in the bottoms of large containers. Sterile and lightweight, they protect the roots from the danger of rotting in standing water while reducing the weight of large pots considerably.

I also cover the drainage holes with old nylons. This effectively retains the loose soil while repelling pesky insects that sometimes make their homes in pot bottoms.

'Mrs. Taylor' is a good candidate for a sunny window. It flowers freely and its leaves are scented.

A basket of flowers of scented geraniums shows the variety of colors and the combination of colors of some scented geraniums.

Although occasionally one of the collection leaves me for whatever reason, these agreeable houseplants are not particularly prone to insects or diseases. The heavy oils may well be repellent. They are simply short-lived perennials. When I lose one, I gather up all the dried leaves, which continue to live on in the next potpourri mixture.

Pelargoniums are best started from cuttings; however, a few grow readily from seed. Apple-scented with its clusters of insignificant flowers, frequently self-sows outdoors, popping up in unexpected places. In fact, it sometimes refuses to start from cuttings, especially those taken from its trailing stems, as all the others do so willingly. Take cuttings from the outside shoots at the base of the plant with a bit of the base if possible.

Coconut-scented is another obliging self sower, and little plants often can be found nestling around the mother plant.

To start geraniums, take soft cuttings eithe in early spring from succulent growth or in fal from firmer stalks. Avoid mature wood. Three to-six-inch cuttings cut straight across, dippe in rooting hormone and inserted into dam coarse sand, perlite, vermiculite, or even potting soil will give you vigorous new plants fo the garden or to use as gifts. They root in thre to six weeks, usually faster in fall, but they ca be contrary and take longer.

Professionals recommend hardening o geranium cuttings in the air for a day befor attempting to root them. It is also wise to remove all bottom leaves as these will rot underground before rooting takes place. Strong overhead light, gentle bottom heat (about 60 degrees) and careful misting assure success. Scented geraniums are so easy to propagate that a collection can easily proliferate into a small business if you are so inclined.

A potful of dampened sand will support a dozen cuttings. Pop it into a closed plastic bag for several weeks and no extra care is necessary. Put your cuttings in a north light lest the heat build-up inside the plastic cook them. In full sun I have seen temperatures rise to 120 degrees in such a set-up. Once they are rooted, move them into strong light gradually.

Sometimes I simply plunge my good-sized piece of stalk into a colored glass of water where it roots readily in several weeks. An unexpected aid to this casual method is a small piece of pussy willow. As the willow thrusts out its water roots (and it will) the water becomes filled with natural rooting hormones that encourage the geranium to root. This amazing "willow water" will put roots on begonia slips, African violet leaves, and even tough old woody pieces of rosemary — much to my amazement. Try it.

Plant your rooted cuttings in a mixture of potting soil. I use half Pro-Mix combined with half vermiculite, perlite or sharp sand. Thus lightened, the soil provides the good drainage geraniums prefer.

Although they like to be on the dry side, watch carefully for wilting, then water. A filled watering can keeps the water at room temperature and excess chlorine will have escaped into the air. Besides, our four-legged housepets find it handy.

This rose-scented geranium has delightful red flowers and attractive foliage.

The cuttings will soon graduate into larger pots, some eventually reaching tub size. Plan on repotting the robust geraniums several times for maximum size. A pinhead of vitamin B_1 to a quart of water lessens the trauma of transplanting. Do this especially with young rooted cuttings or those just received in the mail.

A spectacular hanging basket may hold several plants for full effect. Remember, this requires watering more often as well as frequent feedings for continued vigor. Bear in mind, however, that over-fertilizing or too-rich soil results in oversized growth with reduced fragrance. To intensify fragrance, give the scented plants an occasional dose of Epsom Salts, one cup to a gallon of water.

Topiaries have suddenly taken the potted plant world by storm. Certain scented geraniums lend themselves to this creative art form. 'Old Fashioned Rose,' 'Clorinda,' 'Rollinson's Unique,' 'Pungent Peppermint,' 'Giant Oak' and 'Old Scarlet Unique' can become imposing five-foot lollipop plants when trained successfully. The "crispum" group of treelike lemon geraniums make somewhat smaller specimens, equally charming.

Unless you already have a very tall plant available, select long cuttings from your stock plants, the longest, straightest and most vigorous shoots available. Do not pinch out the tops as you wish to encourage upright growth.

Take as many cuttings as you wish, then add a few extras as insurance. As soon as they root, pot them in individual four-inch pots of amended houseplant soil to which has been added a cup of bonemeal to a gallon of soil.

As a plant grows, remove bottom and lateral shoots only, forcing top growth until your standard is as tall as desired. Only then can the top be pinched out to encourage bushiness.

Along the way you will be increasing pot size and, very important, staking the little tree-to-be with a sturdy dowel. Do you envision a three-foot standard or a five-foot standard? Use the size stake necessary to support your plant, firmly anchored and securely tied to the trunk lest the brittle stalk snap in an ill wind.

In the second year, your pride should be blooming atop its tall stalk, flourishing on its own. Such handsome additions to the collection, worthy of a proper jardiniere, will surely stand out in the crowd. With proper care it will give you years of pleasure.

Not usually grown for their sometimes wispy flowers, the strong essential oils captured in pelargonium leaves have been one of the most important fragrance ingredients for commercial purposes. The perfume industry utilizes tons of geranium oil from leaves and stems, a substitute for costly rose oil. In the 1800s England established rose geranium plantations in South Africa for distillation purposes.

In these mimic plants, the fragrance quickly translates into flavor. Enjoy them as sweet-scented bouquets, potpourris, fireplace incense, or sachets but also try them in your cuisine.

A few leaves in a sugar bowl impart a subtle flavor; toss a leaf of peppermint or lemon into your next pot of tea; a few of the flowers deliciously grace any dessert; chop some leaves into your next tossed salad; float a pretty leaf in your breakfast orange juice; or freeze the leaves in ice cubes for festive goblets of water; serve a salad on the largest leaves in your collection; wrap butter in the largest fresh rose geranium leaves for a day or two while the fat extracts the oils with the magnetic affinity of enfleurage.

Experiment with all the flavors found in scented geraniums. You will enjoy your fragrant houseplants all the more. Oh, yes, the Victorians doted on tiny lemon geranium leaves in their finger bowls. Try that bit of fun on your next dinner guests.

Caution: To start a collection of these easy going aromatic and edible herbs is to want them all! It's exactly like dipping into a box of assorted chocolates; one can't stop. Be warned, it's more than just another hobby. The search for new and different "SCENTEDS" is half the fun. The rewards lie in the astounding variations within the collection. One would need an enormous window to house them all. No one greenhouse has them all; here are some sources to explore. ❧

SOURCES

Merry Gardens
P. O. Box 595, Camden, ME 04843
(Catalog $1.00)

Catnip Acres Herb Farm
Christian Street, Oxford, CT 06483

Shady Hill Gardens
821 Walnut St., Batavia, IL 60510

Logee's Greenhouses
55 North Street, Danielson, CT 06239
(Catalog $3.00)

Sandy Mush Herb Farm
Rt. 2, Surrett Cave Rd., Leicester, NC 28748

Fox Hill Farm
444 W. Michigan Ave., Box 7, Parma, MI 49269

Well-Sweep Herb Farm
317 Mt. Bethel Road, Port Murray, NJ 07865

The Rosemary House
120 S. Market St., Mechanicsburg, PA 17055
(Catalog $2.00)

Caprilands Herb Farm
534 Silver Street
Coventry, CT 06238
(List for SASE)

Young's Mesa Nursery
2755 Fowler St., Arroyo Grande, CA 93420
(Catalog $2.00 refundable)

Cook's Geranium Nursery
712 N. Grand St., Lyons, KS 67554
(Catalog $1.00 refundable)

Abbreviated List of Scented Geraniums

Rose Scents

Attar of Roses
Giant Rose
Grey Lady Plymouth
Lady Plymouth (*P. graveolens*)
Old Fashioned Rose
Rober's Lemon Rose

Silverleaf Rose
Dr. Livingston
Snowflake
Velvet Rose

Minty Scents
Chocolate Mint
Joy Lucille
Mrs. Kingsley
Peppermint (*P. tomentosum*)
Pungent Peppermint (*P. denticulatum*)
Variegated Mint
Peppermint Rose

Spicy Scents
Cinnamon
Cody's Nutmeg
Ginger (*P.* 'Torento')
Old Spice
Pretty Polly

Pungent Scents
Brilliant
Fern Leaf (*P. denticulatum* 'Filicifolium')
Gooseberry
Oak Leaf

Lemon Scents
Crispum (*P. crispum*)
Lemon Balm (*P.* x *mellissinum*)
Lime
Limoneum
Prince Rupert
French Lace
Mabel Grey

Fruity Scents
Apricot (*P. scabrum*)
Prince of Orange
Apple (*P. odoratissimum*)
Coconut (*P. grossularioides*)
Strawberry
Fruity

Specialty Scents
Pine (*P. denticulatum*)
Filbert (*P.* x *concolor*)
Scarlet Unique
Clorinda

Free Flowering Scented
Clorinda
Crow's Foot
Mrs. Taylor
Scarlet Unique
Filbert
Prince of Orange
Shrubland Rose
Brilliant
Capri
Fair Ellen (*P. quercifolium*)
Staghorn Oak

BIBLIOGRAPHY

Staff of L.H. Bailey Hortorium. *Hortus Third,* Cornell University, Macmillan Publishing Co., N.Y.C.

Helen Van Pelt Wilson. *Geraniums/Pelargoniums for Window and Garden,* M. Barrows and Co., Inc., N.Y.C. 1946

Helen Noyes Webster. *Herbs: How to Grow Them and How to Use Them,* Charles T. Branford Co., Publisher: 1939

Jill Jesse. *The Perfume Album,* Perfume Perfections Press: 1951

Abbie Zabor. *The Potted Herb,* Stewart, Tabor and Chang: 1988

Audrey O'Connor and Mary Hirshfield. *An Herb Garden Companion,* Published by Cornell Plantations

Madeline Hill and Gwen Barkley (with Jean Hardy). Phyllis Shaudys. *The Pleasure of Herbs,* A Garden Way Book: 1987

Here's one I just heard about, haven't seen it yet — David Clark. *Kew Gardening Guide to Pelargoniums,* English

Peggie Schulz. *All About Geraniums,* Doubleday & Co. Inc. Garden City, N. Y. 1965

Jan Taylor. *Geraniums and Pelargoniums; The Complete Guide to Cultivation, Preparation and Exhibition,* Crowood Press/David & Charles 1988

In pursuit of the elusive Pelargonium, contact THE INTERNATIONAL GERANIUM SOCIETY (Dues $12.50 yearly) 4610 Druid Street, Los Angeles, CA 90032

Night Music

Tovah Martin

My work often keeps me in the greenhouse after dark. Suddenly, that familiar place takes on an entirely differen character. Shapes loom awkwardly and leaf branches block my path. The greenhous becomes a strange, new world.

It's well worth staying after the sun goe down. Bright colors that took center stage b day blend into the shadows after dark an white blossoms pop out in the moonlight. Th

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Tovah Martin is the staff horticulturist at Logee Greenhouses in Danielson, Connecticut. She is also a freelance writer and the author of Once Upon a Windowsill: A History of Indoor Plants *(Timber Press, 1988).*

Epiphyllum oxypetalum, *night blooming cereus, is a dramatic nocturnal bloomer. Bud formation is initiated by cool autumn temperatures. The aroma of dozens of perfumed flowers is something worth waiting for.*

sights are different and sounds seem magnified. But, most important, my nose is greeted by a new collection of scents. After dark, when most flowers lack luster and their aromas fade, night-blooming blossoms begin their display. My greenhouse is filled with a heady elixir of floral perfumes.

I meet a lot of odd fellows after dark. Flowers of the night are typically large and luminous. And the aromas they emit are strange and strong. But, that's not surprising considering that they are trying to attract night-flying insects and bats. Apparently, creatures of the night prefer oversized blossoms and larger-than-life fragrances that a human nose might find a little overwhelming.

Perhaps the best known night bloomer is the dramatic night-blooming cereus. In fact, several members of the cactus family have earned that name due to their nocturnal habits. *Hylocereus undatus* is the most popular night-blooming cereus. In its native Brazil, that climbing succulent is courted by bats who eagerly attend its opening.

The blossoms of hylocereus open only once a year and tarry for only a single evening; they unfurl after dark and fade by daybreak. At 10:00 p.m. they begin to slowly unfold. Finally, an hour later, many foot-wide blossoms are dangling in the air. Each blossom is a frilly mass of creamy white inner petals and powdery yellow stamens. And every flower emits a sweet but cloying aroma to attract its specialized pollinators.

It takes many years for a hylocereus to reach blooming size. But, when it does bloom, the plant is definitely a conversation piece. Like other members of the cactus family, a hylocereus can tolerate a dry home environment as long as it receives bright light. Unfortunately, the plant with its thick, three-ridged stems is a little large for the average home. Most gardeners keep hylocereus in the greenhouse.

Epiphyllum oxypetalum puts on a similar show and shares the name of the night-blooming cereus. Although I wouldn't call it dainty, its broad, flat stems are a little more manageable in a home environment.

Epiphyllum oxypetalum specializes in drama. Triggered by cool temperatures, this succulent forms many tiny buds in the terminal notches of its leaves. The buds initiate throughout the summer, but cease growth at the same size. Then, when the temperatures begin to drop in autumn, the buds swell in unison to mature a month later and open simultaneously. The sight is well worth the waiting — the aroma of dozens of perfumed flowers is even more memorable.

An equally famous nocturnal bloomer is the popular lady-of-the-night orchid with its profusion of white, spiderlike blossoms and characteristically insipid scent. *Brassavola nodosa* remains open both day and night, although its three-inch wide blossoms are only scented after dark. Their smell is not exactly inviting, but the scent does have a certain tawdry "come hither" quality.

Brassavola nodosa is one of the easier-to-grow members of a notoriously difficult family. Not only is its compact habit conveniently apartment sized, but this orchid thrives in a home environment. The Lady-of-the-Night requires at least five hours of bright natural light or 14 hours of fluorescent light daily. Wire its small pseudobulbs to a bark slab, and water thoroughly twice a week, allowing the bark to dry out completely between waterings. With proper care, your brassavola should blossom in autumn. After blooming, rest the orchid for two weeks by withholding water.

Many gardeners don't realize that *Allamanda cathartica* 'Williamsii' is fragrant at night. The allamanda is a rambunctious vine that climbs rapidly and can be trained on a large trellis. Its four-to-five-inch wide, bright yellow, trumpet-shaped flowers appear in masses throughout the year providing quite a show. By day, the petals bend back, at night they lay flat and a delightful, delicate, Manischewitz winelike aroma wafts from the blossoms. The fragrance is an added attraction for a stunning plant.

Equally floriferous and famed far and wide for its nightly entertainment, angel's trumpets also put on a no-holds-barred, year-round performance. Angel's trumpets are in the *Brugmansia* genus (formerly known as *Datura*) and their oversized, dangling trumpets come in several pastel shades. Of all the relatives, the ghostly white *Brugmansia suaveolens* beats other colors in popularity polls.

A few stray blossoms adorn angel's trumpets throughout the month, but on alternate full moons, *Brugmansia suaveolens* really brings down the house. Hundreds of foot-long flowers dangle from the small tree. Each flower glows, illuminated by the light of the moon. By day the flowers are limp, but after dark they swell and emit a musky, honey scent that fills the air.

Every part of the brugmansia is poisonous. In small doses, the plant was once employed as an anesthetic during minor surgery. If consumed in larger quantities, a deadly stupor results. Primitive tribes often employed members of this family in their rituals. South American Indians administered it to youths during initiation ceremonies. The drug induced comas in the young men during which they were expected to forget their boyhood and receive their forefathers' teachings. In Columbia, a drink of datura was administered to the wives and slaves of a dead man before they were buried alive in their master's tomb. In South America, many people still believe that death will haunt anyone who sleeps under a brugmansia tree.

Brugmansias are sizeable plants, but they blossom easily and can be pruned to fit in a home. They need sun to blossom — a southern window would be ideal. Rather than continually repotting, fertilize generously and keep it potbound. Periodic root and foliar pruning will maintain discipline.

Another famed night performer is the night-blooming jasmine, *Cestrum nocturnum*. Unlike many of its fellow evening bloomers, cestrum has a delightfully sugar-sweet aroma. The fragrance is heady, and a little potent in large doses.

Cestrum flowers are insignificant compared to most other night-blooming plants. In fact, the night-blooming jasmine is not related to the real jasmine at all; it shares only a similar scent. Its tiny, fragrant flowers look like long oboes.

Cestrum nocturnum is a large bush that can become unkempt if allowed to grow unchecked. It blossoms in summer, so you can safely keep it heavily pruned in winter and then allow the tips to shoot out in June. Ful sun is necessary for producing a handsome plant and encouraging blossoms.

Nocturnal aromas are one of the small pleasures that reward gardeners who tarry with their plants after dark. At night, nature puts on some of her most dramatic performances.

Sources

Check first with your local florist or garden cente
Each of the specialty companies listed below carr
some of the plants mentioned in the article.

The Fragrant Path
P.O. Box 328, Fort Calhoun, Nebr. 68023
(Catalog $1.00)

Glasshouse Works
Church St., P.O. Box 97, Stewart, Ohio 45778-009
(Catalog $1.50)

Kartuz Greenhouses
1408 Sunset Dr., Vista, Calif. 92083
(Catalog $2.00)

Logee's Greenhouses
55 North St., Danielson, Conn. 06239
(Catalog $3.00)

Louisiana Nursery
Rte. 7, Box 43, Opelousas, La. 70570
(Catalog $3.50)

Stallings Nursery
910 Encinitas Blvd., Encinitas, Calif. 92024
(Free catalog)

Well-Sweep Herb Farm
317 Mt. Bethel Rd., Port Murray, N.J. 07865
(Catalog $1.00)

A bouquet of dried roses will last throughout the winter months preserving the beauty of the growing season.

Preserving Garden Fragrance

Connie Krochmal

Once considered necessary to protect health and combat unpleasant odors, garden sachets and potpourris made from the aromatic flowers and herbs grown in home gardens are now used for enjoyment rather than sanitation. Many gardeners prepare them as gifts for friends and family; they also preserve the aromatic fragrance of the garden over the winter.

The wonderfully fresh plant perfume that potpourri can provide is enough to help chase away the winter blahs, even on the worst days. Because our reactions to pleasant and familiar aromas are closely tied to our emotions, we can, through our senses, be transported back to the summer when the garden was at its peak of beauty. This in turn brings to mind the growing season ahead.

The home garden is an excellent source of flowers and herbs that can be made into fragrant products. Dried materials can be bought to supplement those from the garden. If space is available, you may want to establish a separate area for the aromatics; this will keep the garden proper from looking slightly bare as materials are harvested. A garden for such har-

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Connie Krochmal, who lives in Asheville, North Carolina, is the author of A Guide to Natural Cosmetics, *(Quadrangle/The New York Times, 1973). She and her husband, Arnold, have published numerous books and articles on horticultural subjects, including* A Naturalist's Guide to Cooking with Wild Plants *(Quadrangle/The New York Times, 1975), and they write a regular garden column for The San Juan Star, Puerto Rico.*

vesting is sometimes known as a cutting garden. It may be well to put it out of view, because the continuous cutting will leave it looking a little informal.

A cutting garden requires the same kind of preplanting planning as a vegetable garden. Since it won't be a part of the planned landscape, it can be set out in an arrangement of rows and plantings that best suits the working habits of the gardener. Some people like to use long rows so that the soil between them can be easily tilled. The rows can be narrow, for single row planting, or wider, for double row planting, provided the plants can be kept within arms' reach for harvesting. Determine the amount of space between plants by the size of the mature plants; there must be enough space to allow for good air circulation, which helps control disease.

If at all possible avoid using pesticides and fungicides, since residues might be present at harvest. Prevention is the most important control. Provide the plants with good care, adequate water and fertilizer. A healthy plant is far more likely to survive problems than a plant which is not receiving sufficient moisture and nutrients. When you do water, water thoroughly, allowing the soil to dry out before watering again; too much water is as harmful as too little. Watering once a week should be adequate if you get the soil moist to a depth of five or six inches. It is a good idea to test the soil for fertilizer requirements. The State Agricultural Extension Services at Land Grant colleges will do this for a nominal charge, and there are also inexpensive soil testing kits which anyone can easily use. A fertilizer too high in nitrogen (the first number listed on the bag) is not recommended because it can interfere with and reduce flowering, since vegetative growth responds to nitrogen, N. Aromatic herbs, in particular, can suffer excessive growth, and consequently, reduced fragrance and flavor.

Sanitation is also important in protecting the plants' well being. Pick dead leaves and other parts off the plant and remove them from the garden area. Any plants that exhibit disease symptoms should be promptly eliminated.

Large insects can be picked off of the plants and destroyed. One very useful control is *Bacillus thuringiensis* sold under several trade names, including Dipel and Caterpillar Attack. Insecticidal soap spray is a good control for whiteflies and aphids. I use diatomaceous earth to control slugs and snails. All of these controls are toxic to specific pests, but won't harm beneficial insects

If you plan to have a fairly large number o plants in your fragrance garden, it may be economical to start them from seed, if you have the space and time. However, if your garden is small, it may be more practical to buy what you need at a garden shop or nursery, as most packaged seeds are expensive Some plants, herbs in particular, can be started from cuttings. Many perennial herbs can be separated, and this is another way of getting plants.

Planting time is determined by climate Some annuals, such as stock, sweet pea, and mignonette, do best in the cool weather o early spring, and slow down or stop growing once the hot summer weather arrives. If you live in a cool climate, set tender plants ou after the danger of frost is gone unless yo plan on covering them when frosts threaten Plastic minigreenhouses, called cloches which are very lightweight, can be used fo early planting protection. I use them, and i each one I put a couple of quart jars filled wit water as solar collectors to keep the temperature up at night. Large glass jars can b used to cover individual plants, but they mus be removed to avoid heat buildup during th day. Some people cut off the pouring ends o gallon plastic jars and use the rest as miniature, one-plant cloches to cover plants.

Picking the Flowers and Herbs

Harvesting must be done regularly once th plants reach the appropriate stage of maturit Flower fragrance is strongest when the flow has just opened, and dissipates quickly in th heat of the day. Honeysuckles, which are mo aromatic in the evening, are exceptions. Late evening and early morning are probably the best times to harvest flowers and herbs; at midday the warmth reduces the scent.

Most herbs, with the exception of lavender, thyme, and rosemary, should be harvested before blooming, when their fragrance is strongest. If flowers do appear, try not to let them remain on the plant beyond first bloom. If something, such as rain, makes harvesting impossible for several days, cut the flowers as soon as you can, as leaving them on the plant leads to seed production, and can also result in disease buildup.

Drying

Some of the aromatic products are better if made from fresh materials, while others are better when dried, then mixed. The fresh plant is generally used is making floral waters, colognes or herb vinegars, but for many herbal products, such as cosmetics, mouthwashes, and herbal bath bouquets, either fresh or dried plants may be used, depending on the particular formula. Rose water is made from petals preserved in salt.

If the materials are to be dried and mixed, special care is needed to prolong the fragrance. Drying in direct sun can reduce fragrance as well as bleach color. A temperature of 70° to 90°F is about right. Air circulation is important; this can be provided by a small house fan, set on low to avoid gusts. I use a solar drying box with several trays, in a screened porch (see drawing). When the plants are ready they should feel dry and somewhat brittle. If they are to be used for a moist potpourri they are usually dried for only about 24 hours.

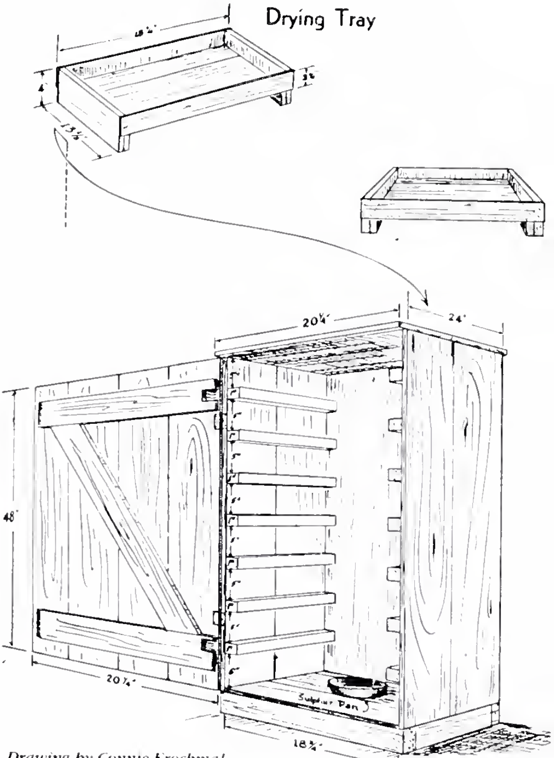
As the materials reach the desired stage remove and store in separate containers, in a dark, cool place. I prefer sealed glass jars to plastic bags, as the materials age somewhat in bags.

Preparing the Products

It is not always necessary to measure carefully, or have exact proportions, when making herbal products. Personal preference and availability of materials will determine the amounts. In an herbal or floral liquid mixture, the ingredients should balance, with a sufficient quantity of plants well dispersed in the liquid. Initially strong-scented materials should be used sparingly so they don't overwhelm milder scents. A general rule for most potpourris is between three-quarters and seven-eighths flowers, and the remainder leaves.

Avoid isopropyl or rubbing alcohol, as it can detract from the product by its own strong smell; instead use ethyl alcohol, which is available at pharmacies.

The methods given here, which should be easy to follow, allow room for trial and error and individual creativity. Keep in mind that if you are not pleased with a final product, it may still be usable. For example, a floral water with a very faint aroma, too weak to use as a body wash, can be diluted with a small amount of water, boiled for a few minutes, and then used as a liquid room freshener.



Drawing by Connie Krochmal

Floral Waters

Place the flowers or herbs in a clean jar, add enough alcohol to cover. Seal and set in a dark place, such as a closet or cabinet. If possible, replace the materials every day for several days. When you feel the fragrance is strong enough, you may wish to stir in a little essential oil of the same kind. The final product can be used as is, or diluted with water, depending on the strength of the original product and your needs.

Floral Oils

Place the flowers or herbs in a clean jar, then cover with a scentless oil, such as corn oil (a strong smelling oil could compete with and distract from the plant fragrance). Follow the same procedures as above. You can remove the old plants by draining the oil through an ordinary kitchen strainer, and then returning the oil to the jar. The final product can be used as a bath oil, diluted with alcohol and used as perfume or cologne, or sprinkled lightly on a potpourri.

Herbal Vinegars

These are made in the same way as the preceding, but white wine vinegar is used as the solvent. When the aroma is as you want it, allow it to stand for several weeks before using. The product can be used as a hair rinse, or a small amount can be added to the laundry. For using on salads or in cooking, blending at a one to one ratio (or according to taste) with a white wine is suggested.

Herbal Cosmetics

A wide variety of cosmetics can be made from plants; many of them are covered in my book, *A Guide to Natural Cosmetics*. The following are a few of the numerous techniques that can be used.

To prepare an aromatic infusion of plants, immerse them in boiling water. Then allow them to stand for several hours until the infusion has the desired fragrance. Strain and discard the plants. This material can be used as the basis for several different products, including mouth wash, if you are familar with the

A nosegay composed of herbs will greet visitors when attached to the front door. These herbs wi dry naturally.

plants (mint, for example) and know that the are safe. Sweet spices, such as cinnamon well as sherry, can be used to give mout washes a delightful taste.

The infusions can be used as skin toners an hair rinses. Witch hazel, in a proportion about 1:4, works well as a toner for oily skin. make an aromatic shampoo, simply mix infusion with some liquid castile soap. Th same infusion can be used for an herbal bat Herbal baths, which are very refreshing an leave a light glow on the skin, can also b prepared by placing a small cheese cloth ba of plants under the faucet while running th water. About a half cup of dried fragrant plan will do the job.

A tussie-mussie — an attractive flower su rounded by aromatic herbs — is also a sort herbal cosmetic. In Victorian times a la going to a social event would wear one as corsage; besides making her smell sweet, th tussie-mussie protected her from unpleasa odors.

Ornamental Fragrances for the Home

Dried plants have been used throughout history to provide pleasant odors in the home. Some dried herbs, particularly rosemary, lavender, sage, and southernwood, have also been burned as incense.

Dried materials also make handsome as well as aromatic indoor decorations. Lavender is a particular favorite. Cut the plants while in bloom, in bundles of about a dozen. Fold the ends over and tuck them in; this gives them the shape of "lavender bottles." Tie the stems together with a ribbon. Many dried plants can be tied in bunches like bouquets and then hung as decoration for doors or bedposts.

Sachets and Potpourris

These are probably the most popular providers of garden scent and fragrance in the house. Sachets are made of dried plants sewn or tied up in packages, usually pieces of cloth or handkerchiefs; these are placed in drawers, linen closets, or sometimes on the arms and legs of furniture.

There are two kinds of potpourri. Dry potpourris consist of dry plant materials kept in open containers. Moist potpourris, made of other kinds of plant material, are kept in heavy pottery containers and uncovered only when wanted.

Dry potpourri is made of dried flower petals, fragrant leaves, herbs, spices, seeds, essential oil or oils, and sometimes a fixative, such as camphor oil. Many kinds of ingredients can be used. I like a combination of about seven-eighths dried flower petals and one-eighth fragrant dried leaves. Too many leaves can overwhelm the floral fragrance. For each quart of dried mixed materials add about half a cup of fixative, camphor oil, or dried orris root and then about a tablespoon of some spice, to produce the desired aroma. A spicy or fruity aroma goes well in the kitchen. In other rooms personal preference decides what to use. Mix all of the ingredients gently to avoid crushing the flowers. A drop of essential oil, such as citrus oil, can be added. Place the mixture in a sealed container in the dark for three months to ripen. When it is taken out for use, place a few attractive whole dried flowers on top for decoration.

This sort of dried mix can be made into sachets or crushed and tied into cloth bags for use in linen closets. It can also be sewn into larger sachets, about four inches square, for insertion into pillows, which are called sleep pillows. The same mix, simmered gently in a small amount of water, will release a nice aroma into the home.

All varieties of spring hyacinth are fragrant. Not all daffodils are fragrant, but many are and will thrive undisturbed for years if planted in well-drained, root-free soil and fertilized annually as leaves emerge.

A moist potpourri is not intended to be decorative, as it has been mixed and stirred so much that it has a dark color and the component parts are not identifiable. The mixture is kept in a heavy ceramic or pottery container with a lid that can be removed to release the fragrance. Such potpourris are long lasting. Sometimes the ingredients are dried overnight before being placed in the pot, other times not. Dried rose petals are the main ingredient. Place them in the pot in layers alternating with layers of non-iodized salt. When the container is filled place a heavy plate or object on top of the petals. After a week or two herbs can be mixed in. You can also add a fixative—about one quarter cup to every four cups of plant material. Small amounts of essential oil, brandy, or cologne can also be mixed in. Stir every day to keep the ingredients in touch with each other, and be sure to keep covered. It will take several months for the fragrances to age and blend together.

Plant and Seed Sources

1. W. Atlee Burpee & Co. Warminster, PA 18974.
2. The Cook's Garden. P.O. Box 65, Londonderry, VT 05148
3. Shepherd's Garden Seeds. 30 Irene St., Torrington, CT 06790
4. Sunrise Enterprises. Box 10058, Elmwood, CT 06110-0058
5. Johnny's Selected Seeds. Foss Hill Rd., Albion, ME 04910
6. Stokes Seeds, Inc. Box 548, Buffalo, NY 14240
7. Park Seed Co. Cokesbury Rd., Greenwood, SC 29647-0001
8. Thompson & Morgan. Box 1308, Jackson, NJ 08527
9. Shady Hills Gardens. 821 Walnut St., Batavia, IL 60510
10. Miniature Plant World. Box 7, Sardis, B.C. V2R 1A5
11. Pinetree Garden Seeds. New Gloucester, ME 04260
12. Nichols Garden Nursery. 1190 N. Pacific Hwy., Albany, OR 97321
13. J.L. Hudson. Box 1058, Redwood City, CA 94064
14. John Chambers. 15 Westleigh Road, Barton, Seagrave, Kettering, Northands, NN15 5AJ, United Kingdom
15. Heritage Rose Gardens. 16831 Mitchell Creek Dr., Ft. Bragg, CA 95437
16. High Country Rosarium. 1717 Downing St., Denver, CO 80218
17. Historical Roses. 1657 W. Jackson St., Painesville, OH 44077
18. Roses of Yesterday & Today. 802 Brown' Valley Rd., Watsonville, CA 95076

Sources

Flowering Plants

dianthus, annual or perennial *Dianthus plumarius D. caryophyllus, D. barbatus* 1, 3, 6, 7, 8, 11, 12, 13, 14

filipendula, perennial *Filipendula rubra* 12 13, 14

geranium, perennial *Geranium macrorrhizum*

heliotrope, annual or perennial *Heliotropium arborescens* 1, 6, 7, 8, 11, 12, 13, 14

lily-of-the-valley, perennial *Convallaria majalis* 1, 7

mignonette, annual or perennial *Reseda grandiflora* 1, 3, 6, 7, 8, 12, 13, 14

peony, perennial *Paeonia* hybrids 1, 7, 8, 1

pyrethrum, perennial *Chrysanthemum coc cineum* 1, 6, 7, 8, 11, 12, 14

stock, annual *Matthiola incana* 1, 3, 5, 6, 7 8, 11, 12, 13, 14

sweet peas, annual or perennial *Lathyrus odoratus* 1, 3, 5, 6, 7, 8, 11, 12, 13, 14

valerian, annual or perennial *Valeriana offi cinalis* 12, 13, 14

violet, perennial *Viola odorata* 7, 8, 12, 13 14

wallflower, perennial *Cheiranthus cheiri* 6, 7, 8, 12, 13, 14

wild ginger, perennial *Asarum canadense* 12

Particularly fragrant roses

R. centifolia cabbage or Provence rose 16, 17, 18

R. cinnamomea cinnamon rose

R. damascena damask rose 16, 17, 18

R. eglanteria sweetbriar rose (also known as *R. rubiginosa*) 13-18

R. gallica officinalis French rose 15, 17, 18

R. rugosa rose of Japan 8, 13, 15, 16, 17, 18

Annual Herbs

ambrosia *Chenopodium ambrosioides* 7

anise *Pimpinella anisum* 1, 6, 11, 12, 13, 14

basil *Ocimum basilicum* 1, 2, 3, 5, 6, 7, 8, 11, 12, 13, 14

camomile,sweet *Chamaemelum nobile*

yellow, golden *Matricaria chamomilla* 1, 5, 7, 8, 11, 12, 14

coriander *Coriandrum sativum* 1, 2, 3, 4, 5, 7, 8, 11, 12, 13, 14

hyssop *Hyssopus officinalis* 2, 5, 7, 11, 12, 13, 14

melilot *Melilotus alba* 14

perilla *Perilla frutescens* 1, 4, 5, 7, 11, 12, 14

sage *Salvia elegans, S. officinalis* 1, 2, 3, 5, 6, 7, 11, 12, 13, 14

savory, summer *Satureja hortensis* 1, 2, 3, 5, 6, 7, 8, 11, 12, 13, 14

scented geraniums *Pelargonium* spp. 7, 9

sweet marjoram *Origanum majorana* 1, 3, 5, 6, 7, 8, 11, 12, 14

Perennial Herbs

angelica *Angelica atropurpurea, A. archangelica* 8, 12, 13

bee balm *Monarda didyma* 7, 8, 12, 13, 14

caraway *Carum carvi* 1, 6, 7, 8, 12, 13, 14

catnip *Nepeta cataria* 1, 5, 6, 7, 8, 11, 12, 13, 14

clary sage—used as a fixative. *Salvia sclarea* 2, 12, 14

costmary *Chrysanthemum balsamita* 12

curry plant *Helichrysum angustifolium*

deer's tongue *Trilisa odoratissima* harvest from wild plants, southeastern US.

fennel *Foeniculum vulgare* 1, 2, 5, 6, 7, 8, 11, 12, 14

lavender *Lavandula angustifolia, L. spica* and other species 1, 2, 5, 6, 7, 8, 11, 12, 13, 14

lemon balm *Melissa officinalis* 1, 5, 6, 7, 8, 11, 12, 13, 14

lemongrass *Cymbopogon citratus* 13

lemon verbena *Aloysia triphylla, A. citriodora* 12

mints *Mentha* species 1, 4, 5, 8, 10, 11, 12, 13, 14

myrtle *Myrtus communis* 10

rosemary *Rosmarinus officinalis* 1, 2, 5, 6, 7, 8, 11, 12, 14

santolina *Santolina virens, S. chamaecyparissus* 6, 7, 8

savory, winter *Satureja montana* 1, 7, 8, 11, 12, 14

southernwood *Artemisia abrotanum* 12

sweet cicely *Myrrhis odorata* 8, 12, 13, 14

sweet woodruff *Galium odoratum* 1, 7, 12, 13, 14

tansy *Tanacetum vulgare* 1, 5, 7, 11, 13, 14

thyme *Thymus vulgaris, T. serpyllum, T. citriodorus* 1, 2, 3, 5, 6, 7, 8, 11, 12, 13, 14

Sources for Plants and Essential Oils for Potpourri

Indiana Botanic Garden
Box 5
Hammond, IN 46325

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518 Lexington Av.
New York, NY 10017

Golden Meadow Herb Farm & Emporium
431 South St. Augustine
Dallas, TX 75217

Gilberties Herb Nursery
7 Sylvan Lane
Westport, CT 06880
203-227-4175

Books on Fragrance

Elisabeth Woodburn

From ancient times to the present, humankind has shown an interest in pleasant scents. Ancient paintings depict incense offerings, and medieval manuscripts record the fragrant characteristics of plants. The arrival of the printed book made it possible to record the plants from around the world that could please the sense of smell, as good food satisfies the sense of taste.

Before the age of plumbing it was common practice to strew fragrant plants to offset rank odors. Since lack of plumbing also indicated the absence of baths, it is easy to understand why householders were interested in the development of fragrant waters such as rose water and hungary water. Early distillers developed a method of preserving odors in alcohol.

Books on the development of perfumes record the many ways in which people have tried to preserve the fragrances they have found most pleasing. A popular work by G. W. Septimus Piesse, *THE ART OF PERFUMERY And the Methods of Obtaining the Odors of Plants*, which was originally published in French, then translated and published in England, and later republished in Philadelphia in 1856, is a good example of the trans-cultural interest in the subject. A number of scholarly studies on odors, fragrance, and perfumes were produced in France, Germany and England. The serious literature is extensive, but there are fewer popular works. The emphasis in almost all the literature is on the capture and preservation of fragrance.

Chinese witch hazel (Hamamelis mollis)

Books on the cultivation of fragrant plants are largely the efforts of twentieth century writers. This is not to say that writers in the past ignored fragrant plants, because the nineteenth century provided F. T. Mott's *FLORA ODORATA; A Characteristic Arrangement of Sweet-Scented Flowers and Shrubs, Cultivated in the Gardens of Great Britain*, in 1843, and, in 1895, Donald McDonald's *SWEET-SCENTED FLOWERS AND FRAGRANT LEAVES; Interesting Associations Gathered from Many Sources, with Notes on Their History and Utility*. The latter had an introduction by William Robinson and contained 16 color plates. It was sufficiently popular to warrant a reprint as *FRAGRANT FLOWERS AND LEAVES* in both New York and London in 1905. Its comprehensive listing of fragrant plants

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Elisabeth Woodburn owns Booknoll Farm, a bookshop in Hopewell, New Jersey, that specializes in books on horticulture and agriculture. She is a founding member and former president of the Antiquarian Bookseller's Association of America.

their botanical names, habitat, and odor characteristics explained its popularity.

THE BOOK OF THE SCENTED GARDEN by a knowledgeable horticulturist, F. W. Burbidge, was published in London—and also in New York—in 1905. The fact that this was issued in a very popular and well-written series, "The Handbooks of Practical Gardening" indicates that the subject was appealing at the time. The 30 plus volumes in the series reflect the strong interest in horticulture at the beginning of the century.

The next volume in English appeared in 1925. This was F. A. Hampton's *THE SCENT OF FLOWERS AND LEAVES, Its Purpose and Relation to Man*. This is regarded for its description of the oils in plants, the functions of scent, botanical characteristics and color.

Eleanour Sinclair Rohde's *THE SCENTED GARDEN*, first issued in 1930 in London, was the forerunner of the modern books on fragrant plants. Miss Rohde, an able research scholar, discusses various types of aromatic plants, describes the best varieties, and includes recipes taken from the past as well as from the present. The book was repeatedly reprinted both here and in London. A revised edition in a smaller format was published in the U.S. as well as in London in 1948. It is still available in reprint.

A year after Miss Rohde's book first appeared, T. Geoffrey W. Henslow published *GARDENS OF FRAGRANCE*. A second edition came out in 1934. This practical work was devoted primarily to growing plants.

THE FRAGRANT PATH by Louise Beebe Wilder is most likely to remain the favorite among U.S. books on the subject. It was first published in New York in 1932 with a color frontispiece. It was reprinted (sans frontispiece) many times and is now available in a paperback reprint under the title *THE FRAGRANT GARDEN*. (Why titles are changed in reprints and imports is one of life's more annoying mysteries.) Louise Beebe Wilder, acclaimed as one of our most knowledgeable garden writers, wrote in an informal style that shares knowledge and friendship with the reader. Witness this passage: "Ancient books teach that the smell of many plants, rosemary among them, strengthens the memory, but none that I have come across calls attention to the trick that perfume sometimes plays us of suddenly calling up out of the past a scene, an episode, a state of mind, long buried beneath an accumulation of years and experience. How often the scent of some flower—honeysuckle, jasmine, lilac—stealing upon our senses in the night, causes the darkness to flower in visions of hallucinatory vividness.' 'Smell,' wrote E. F. Benson, 'is the most memoristic of the senses.' Wilder's knowledge of garden literature is another enjoyable feature of her writings. She quotes the opinions of a wide variety of writers, giving them both appreciation and credit. Her knowledge of plants came from growing and observing them.

FRAGRANCE IN THE GARDEN by Anne Dorrance, published in New York in 1937, includes practical lists of fragrant plants for each season with tips for cultivating them. It is a small book which gives the impression that the writer noted the necessary information but did not "pad it". A quotation conveys this: "Unfortunately, as a word, smell has lost caste. Just the same the sense of smell, by whatever name you call it, plays a supreme rôle in life. Though we may call it fragrance, scent sweet and aromatic, though we seem to forget that opposites are there, we are still dealing with one of the basic factors of life."

The return to pleasure gardening after World War II brought forth a number of books which show that fragrant plants are increasingly appreciated for the added dimension they give to garden enjoyment. In 1955 in England Roy Genders's slim volume, *PERFUME IN THE GARDEN*, described various plants, giving descriptions, varieties, and information on their suitability for various uses. The popularity of this undoubtedly led to his 1977 *SCENTED FLORA OF THE WORLD*, which contained 560 double-column pages describing and growing facts about seeds, habitat, and cultivation of a large variety of plants. Genders also wrote *THE SCENTED WILD FLOWERS OF BRITAIN* in 1971, further proving his interest in the subject.

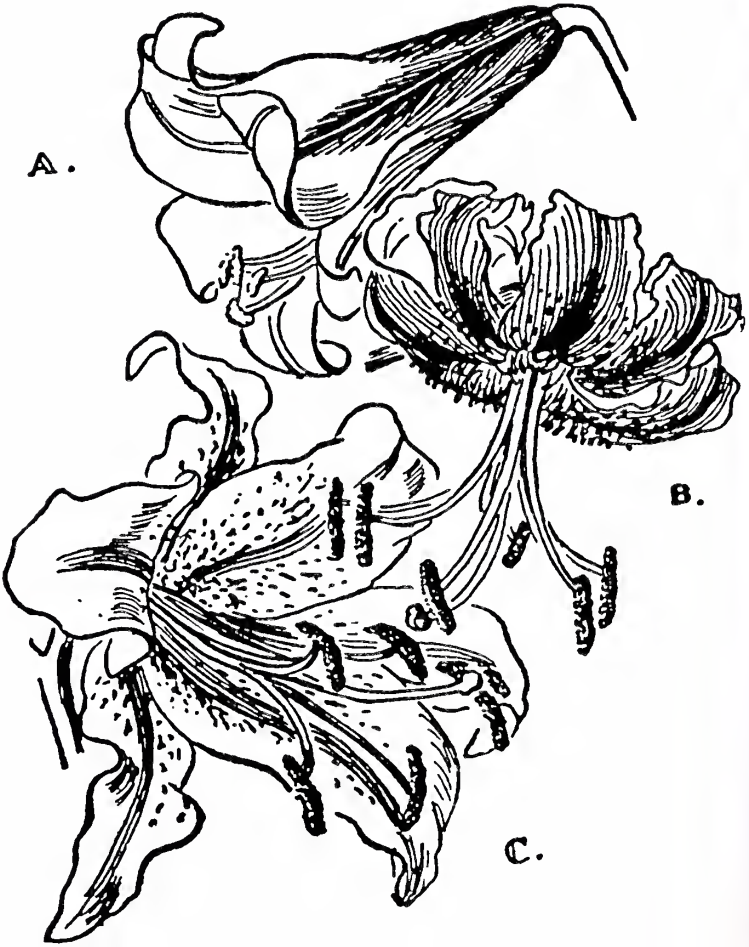
High on my list of favorite books is Margaret Brownlow's *HERBS AND THE FRAGRANT GARDEN*. She originally published it herself in 1957 as a 140 page work with 28 color plates that she not only drew but also ran off on a Gestetner machine she had on The Herb Farm in Kent. The public appreciation for this was such that in 1963 a commercial publisher brought out a greatly enlarged 2nd edition with 32 color plates by the author illustrating 318 herbs and shrubs. This second edition ran to 223 pages and had chapters on the quest for and the history, cultivation, and uses of herbs and aromatic plants. This edition also includes a reference section with a chronology of flowering times and classified lists of aromatic shrubs and North American herbs. There is an alphabetical listing of all the plants mentioned, with details of their characteristics, uses, propagation and culture. A third edition issued in 1978 was published in this country as well.

Norman Taylor, an American writer with many books to his credit, wrote *FRAGRANCE IN THE GARDEN* in 1953. This is a fairly brief introduction to the subject covering the essentials of planting and preserving fragrant plants in the six main odor groups used by perfumers.

Nelson Coon's *FRAGRANCE AND FRAGRANT PLANTS FOR HOUSE AND GARDEN* in 1967 included a thoughtful chapter on "The Invisible Garden"—gardens for the blind. Since Mr. Coon worked with blind people for a good many years he has made a number of observations that will surprise those who have not considered the reactions of the blind to

Fragrant lilies

A. Lilium regale, *B.* Lilium speciosum, *C.* Lilium auratum



such gardens. Other chapters on the role of therapy, religion, and sex add more of Mr. Coon's viewpoints. The second section, "Fragrant Plants For Every Garden", lists many plants for various sweet-smelling plantings. In 1970 this book was brought out again by another publisher as *GARDENING FOR FRAGRANCE*. This was not changed from the original.

THE FRAGRANT YEAR: Scented Plants for Your Garden and Your House, a book full of lovely drawings by Leonie Bell, includes her comments—especially on old roses which she found by searching early cemeteries. Helen van Pelt Wilson collaborated with her on this handsome work. The plants are discussed for their particular fragrances, best sites and seasons of bloom, and particularly good varieties are listed. The book was published in 1967 in New York and had a later reprint, also no longer available. Those who have had a chance to use the book search for copies of their own since it is both useful and attractive.

In recent years three appealing books have been added to the limited number of titles devoted to fragrant plants. All three were published in 1981. Frances Kelly's *A Perfumed Garden*, has special interest to us because it is an Australian publication. It enlarges one's fragrant plant palette by describing a number of Australian plants as well as more familiar ones. Her bibliography includes the English and American titles listed above. The charm of the book is greatly enhanced by Penny Dowie's pencil drawings and by four delicate color plates. Frances Kelly's writing is clear and direct. That it is popular is evident from the fact that a fifth impression of the book came out in 1984. The brief note on the author that appears on the dust jacket bears repeating "a journalist, poet, theatre critic, blurb writer, and member of the Commonwealth Film Censorship Board. She has written seven books on gardening and related subjects, also a play and children's stories. Despite all that she remains cheerful." This is the sort of humorous remark that makes Australia a great place to visit for the people as well as the plants.

Kay Sanecki's *THE FRAGRANT GARDEN* is adorned with four color photo plates, nine black and white photos, and 39 line drawings of plants by Rosemary Wise. The line drawings are particularly successful in their emphasis on the salient characteristics of the plants. The chapters are on fragrance and the plant, the love of scent, the search for scent, the centuries of growth, the fragrant garden emerges, and gardening with fragrant plants. The bulk of the book is devoted to a catalog of fragrant plants; this is divided into sections on greenhouse plants, bulbs, shrubs, green aromatics, trees and flowering plants. The book is interestingly written and filled with pertinent information.

Lastly, Rosemary Verey's most attractively produced book, *The Scented Garden*, is filled with color photography, color illustrations from old sources, photos and drawings comprising 34 color plates and black and white illustrations of over 170 of the 1100 plants listed. The plants are arranged by type—roses, flowers, bulbs, herbs, trees and shrubs, and exotics—with practical and historical information included. Both these last two titles were published in England; Mrs. Verey's work has been issued in the U.S. as well.

This list, devoted to books on fragrant plants does not even try to touch on the enormous amount of information on scented plants in a wide variety of other books. The old herbals are filled with notes on the scent of plants, wise men have pondered on the reason for scent, others have filled volumes with notations on the chemical elements that produce scent, and there are individual volumes on roses, lilies, violets and many other plants. The perfumers who use such vast quantities of the scented plants for perfumes and cosmetics have produced a large literature in many languages; these books cover everything from chemistry to manufacturing processes, with histories thrown in to supply the romantic touch. This summary should serve as a springboard for your own collection of books or notes on the books that you find most useful. To paraphrase an old quote on beauty—scent is in the nose of the breather!

Fragrant Bulbs

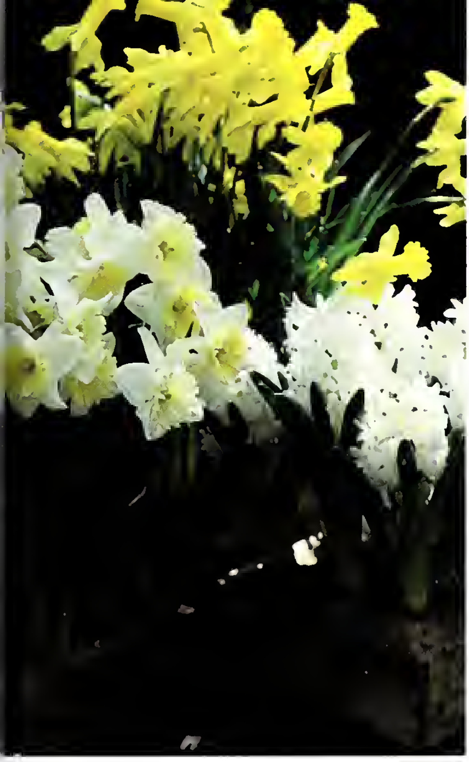
Deborah Peterson

Bulbs make glorious additions to any garden. There are bulbs for every season in a wide variety of colors, sizes and shapes. They are carefree, pest resistant, easy to grow, and you don't have to wait years for them to mature. With bulbs you can create a beautiful fragrant garden instantly.

The bulbs you purchase are totally self contained; the large succulent base will supply all the food necessary for one year. If you cut a daffodil bulb in half lengthwise, you will see that the tiny embryonic flower has already developed. Getting bulbs to repeat blooming is another matter altogether. Many hybrid tulips will not flower again and if they do, the flowers will be much smaller. Narcissus, crocus, muscari and many other small bulbs will repeat year after year.

Whether you are considering bulbs for summer or spring bloom, there are three categories, early, midseason and late. Typical of the early spring bulbs are crocuses and snowdrops, which bloom in late February or early March. Typical of the late-blooming bulbs are lilies-of-the-valley and iris, which bloom in May. Summer early blooming bulbs are the mid-century hybrid lilies, which bloom in June. Late blooming bulbs are *Lycoris*, which bloom in August. Most catalogs list bulbs by their blooming season.

Bulbs offer an enormous palate of color, and if you study blooming sequences, you can make wonderful combinations. Early daffodils combined with blue muscari make a lovely display. Pink tulips and white daffodils blooming under pink flowering trees is another easy and attractive combination. The possibilities are endless when you combine bulbs with perennials that bloom at the same time.



Not all daffodils are fragrant so be certain to give them a nose test if seeking fragrance. Hyacinths are quite aromatic.

Spring Flowering Bulbs

Name	**Color**	**Season**	**Hgt**	**Zone**
Hyacinthus orientalis (Dutch hyacinths) All are fragrant.				
	Pastels	Early	12″	4-8
Narcissus: (Daffodils) There are thousands of daffodils and many of them are fragrant. Listed here are those species known for their fragrance and some of their offspring. Unlike many other species of plants, narcissus do not lose their fragrance with hybridization. If the species is fragrant, there is a good chance their hybrids will also be fragrant.				
Division I hybrids: These are the typical large cupped daffodils one thinks of naturalized on the hillside. Very few are fragrant.				
N. 'Louise D'Coligny'	white/apr	mid	16″	4-8
N. 'Scarlet Gem'	yellow/red	mid	16″	4-8
N. poeticus: Pheasant's eye with a short cup, and white petals. The cup is frequently rimmed with red.				
N. 'Actea'	white/yel	late	17″	5-8
N. 'Mega'	yellow/red	late	18″	5-7
N. triandrus: A charming group of slightly smaller narcissus, the petals are frequently recurved and each plant has at least three flowers per stem.				
N. 'Hawera'	yellow	mid	8″	4-8
N. 'Thalia'	white	mid	16″	4-8
N. 'Cheerfulness'	white	late	15″	4-8
N. 'Yellow Cheerfulness'	yellow	late	15″	4-8

N. jonquilla: Another dainty group of miniature narcissus that are characterized by clusters of small, short-cupped yellow flowers. They are extremely fragrant.

N. 'Baby Moon'	yellow	late	7″	4-8
N. 'Sugarbush'	white/yel	mid	7″	4-8
N. 'Waterperry'	white/yel	early	12″	4-8

N. tazetta: This narcissus is characterized by a short cup and may have as many as eight flowers per stem. All are very fragrant.

N. 'Canaliculatus'	white/yellow	mid	6″	7-9
N. 'Geranium'	white/orange	mid	12″	4-8
N. 'Minnow'	yellow	late	8″	4-9
N. 'Grand Soleil d'Or'	yellow/orange	late	12″	7-10

(Can be forced without cooling)

Tulips: Tulips offer the widest spectrum of color of any of the bulb genera. There are vibrant reds, deep purples, oranges, stripes and all shades of pastels. They do have one problem, rodents love them. In the hard winter months, nothing tastes better to a squirrel or rat than a tulip bulb. When planting tulips, put moth balls in the holes first and the tulips on top. The camphor does not hurt the soil or the plant, but it really deters the beasts.

Few tulips are fragrant. Those listed below are the ones with which we are familiar.

T. 'Bellona'	yellow	early	14″	3-8
T. 'Celsiana'	yellow	late	5″	4-8
T. 'United States'	orange	early	14″	4-8
T. 'Peach Blossom'	pink	early	10″	4-8
T. 'Princess Irene'	orange	early	12″	1-8
T. 'Apricot Beauty'	pink	mid	16″	4-8

Drawing by Barbara Bruno

Name	Color	Season	Hgt	Zone
T. 'Cheerleader'	red	mid	16"	4-8
T. 'Bestseller'	orange	mid	16"	4-8
T. 'Orange Bouquet'	orange	late	20"	4-8
T. 'Angelique'	pink	late	18"	4-8

Miscellaneous and small bulbs:

Iphbeion uniflorum	blue	late	6"	5-10
Iris danfordiae	yellow	early	6"	3-9
Iris reticulata	blue	early	6"	3-9
Muscari armeniacum	blue	early	6"	3-9
Muscari botryoides	blue	early	5"	2-8
Ornithogalum arabicum	white	late	2'	7-10

Summer Flowering Bulbs

Acidanthera murieliae	white	late	24"	8-10

A lovely delicate bulb that is closely related to amaryllis. The flowers are white with red throats and borne on 24" spikes.

Alstroemeria	spotted	mid	3'	7-10

Large clusters of curiously spotted flowers in shades of orange, cinnamon, salmon and pink are borne throughout the summer. The bulbs must be dug in the fall in the North.

Crinum x *powellii*	pink or white	mid	3'	7-10

Lovely trumpet-shaped flowers are spicily fragrant and borne atop three-foot spikes. Crinums have an extensive period of bloom, from July through August.

Eucharis grandiflora: (Amazon lily)	white	mid	2'	9-10

A wonderfully fragrant plant for pot culture in the North and a perennial for Southern gardens. Clusters of three-inch fragrant white flowers are borne throughout most of the summer.

Hedychium coronarium: (Butterfly lily)	White	mid	3'	8-10

The three-inch fragrant white flowers are shaped like butterflies and are borne in clusters atop three-foot spikes. The bulbs must be dug in the fall in the North and stored over the winter.

Hemerocallis (daylilies)

There are hundreds and hundreds of hybrid daylilies but only a limited number are fragrant. Most catalogs will list fragrance as a quality. The practice, however, is to purchase blooming plants in the nursery. Here are a few with which we are familiar.

H. 'Hyperion'	yellow	everblm	48"	3-9
H. 'Classic Simplicity'	yellow	midseason	36"	3-9
H. 'Lexington'	cream	late	40"	3-9
H. 'Mary Todd'	yellow/or	mid	15"	3-9

Homeria	orange/yellow	early	18"	8-10

These are charming small bulbs for the front of the border. Their leaves are straplike and the flowers are pale pastels.

Hymenocallis narcissiflora white all season 2′ 8-10

(Peruvian daffodil) Each two-foot stem has clusters of spidery white trumpet-shaped flowers with reflexed petals which give the plant a very unusual appearance.

Iris germanica hybrids: early 3′ 4-9

The germanica hybrids are the tall bearded old fashioned irises of grandmother's garden—all delightfully fragrant. There are so many hybrids, and new ones are so frequently introduced, that there is little point to listing them. They come in almost every shade of the rainbow except red. They are a must for the June perennial border.

Lilium species & hybrids: (lilies)

Lilies are perhaps the most fragrant bulbs you can plant in the garden. However, there are so many species, cultivars and intergeneric crosses that it is almost impossible to neatly categorize them. The following are species and hybrids that are readily available.

L. candidum: Madonna lily white early 3-4′ 4-8
L. longiflorum: Easter lily white late 2-3′ 7-9
(This extremely fragrant lily has been doing well in NYC)
L. pumilum: Coral lily red mid 20″ 4-8

Asiatic hybrids: early 20″ 4-8

The flowers, upward facing, come in bright oranges reds and yellows and bloom in June. They are as fragrant as the above species. Examples are:
L. 'Enchantment' (orange), *L.* 'Connecticut King' (yellow).

Aurelian hybrids: mid 3-4′ 4-8

The flowers are downward facing large trumpets and most, but not all, are quite fragrant. Examples are:
L. 'Pink Perfection' (pink), *L.* 'Golden Splendour' (yellow)

Speciosum lilies: late 4-5′ 4-8

These are extremely fragrant lilies from Japan. The flowers are outward facing and fully opened. Examples are:
L. speciosum 'Rubrum' (deep pink), *L. speciosum* 'Album' (white)

Lycoris squamigera: pink fall 2½′ 4-8

The foliage appears in the spring and disappears in June. In the early fall umbels of lily-shaped fragrant pink flowers appear.

Pancratium maritimum: white summer 18″ 8-10

One of the most fragrant and exotic bulbs you can grow. The fragrant white flowers have arching recurving petals. In the north they may be grown in the garden in summer and brought in and stored over the winter.

For a list of public gardens devoted to fragrance send a SASE to: Publications Department, Brooklyn Botanic Garden, 1000 Washington Avenue, Brooklyn, NY 11225.

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PLANTS & GARDENS

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Herbs & Cooking

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foreword

Ann Lovejoy

Food is a lot more interesting than it used to be. To the cooks of my New England youth, garlic was a novelty, and onions were treated with suspicion. Herbs were certainly used, if nearly always dried rather than fresh, but hot, spicy foods were virtually unknown. I can remember my parents holding little dinners at which the tables were draped with checkered cloths and decorated with candles in chianti bottles. Very mild chili or spaghetti might be served, accompanied by a raw, garlicky salad of mixed greens. All this seems extremely tame now, but was considered avant-garde at the time.

For many years, the quintessential American meal was Thanksgiving dinner; roast turkey with mashed potatoes and gravy. There might have been a side dish of fancy green beans (drenched with canned mushroom soup and covered with blanched almonds), but easily the snappiest thing on the plate was the cranberry sauce. Now that turkey might well be smoked over applewood or alder, stuffed with oranges or jalapeño cornbread, sauced with an oil-free pesto of walnuts and cilantro. The side dishes might include anything from fresh chutney or plum sauce to homemade orange-tarragon mustard.

Americans are taking new pleasure in their mixed culinary heritage, choosing to pursue multifarious new directions in our astonishingly high-tech kitchens. We have more and fancier cooking gadgets than ever; anybody who wants one boasts an espresso machine, a special steamer for couscous, a ravioli press. Our supermarkets are fuller than ever, and we can buy foods from all over the world nearly any day of the year. Chilean peaches and strawberries fill the markets in January, along with feijoa and star fruits. In the cities, one can find Wensleydale or pecorino cheeses, Tunisian flatbread or blue corn tortillas, Thai fish paste or Chinese kumquats, fresh duck or trout any time. We dine out often and adventurously, having learned to value and appreciate flavors that would have given our grandparents heart attacks—unless our grandparents were not from these shores. For what has happened is that our many culinary traditions are merging; American food is coming of age. Our melting pot society is beginning to produce a new kind of food, an international cuisine that is solidly American in feeling and approach.

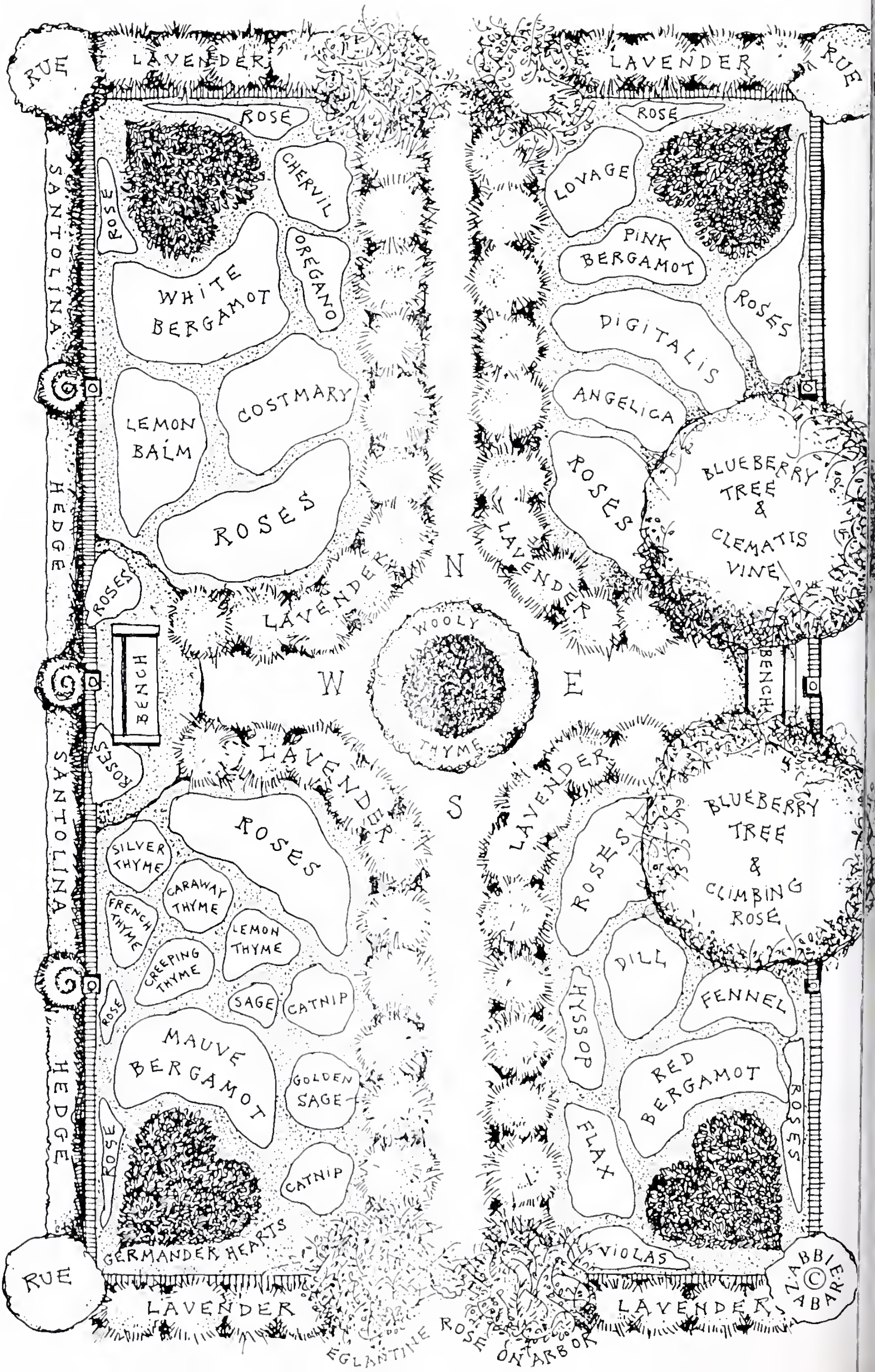
Fresh foods in prime condition, uncomplicated preparations, and savory combinations that emphasize the essential qualities of each ingredient are the hallmarks of this rising new cuisine. Along with our willingness to eat new foods comes a fascination with the making of them. Concern with what goes on in the kitchen soon leads us into the garden, for when we begin paying attention to the quality of our foods, we start to wonder where they come from. The more we appreciate distinctive foods, the more we acknowledge and respect the processes of food raising. What begins as perhaps a somewhat narcissistic care for our bodies ends in stewardship for the earth itself.

Our gardens are also a lot more fun than they used to be. Fresh attitudes, fresh ideas and fresh plants lead us in new directions here as well. No longer content to copy European or Asian traditions, Americans are experimenting, combining standard garden elements in unorthodox ways, evaluating the archetypes with fresh eyes. Not afraid of color, not afraid to break with tradition, Americans are willing to try new patterns, to risk making mistakes. Our approach is flexible, curious, a bit outrageous. Homogeneity is no longer a goal; we are recalling our roots, reinventing them if necessary. Regional patterns, regional tastes, regional specialties are valued as never before. We are looking at where we've been, seeing where we are now, eager to move ahead.

We stand on the edge of new things, in gardens yet to mature, coming into our own after long years of uncertainty. In the New American Garden, as young and raw as the New American Kitchen, herbs both savory and beautiful are finding their rightful place. No longer confined to herb ghettos, herbs are incorporated into the complex and still-developing American Border. What their eventual role will be, no one can yet say. The only certainty is that herbs will find new respect there, praised and prized as never before. Beyond that, nobody can say, but the eventual results are sure to be exciting, surprising and well worth the wait. After all, anything may happen when gardeners are pleased to grow edible herbs purely for their looks while seasoning our salads with flowers.

Ann Lovejoy is a contributing editor of Horticulture *magazine, writes a garden column for* Seattle Weekly *and is the author of several books on gardening and cooking. Her most recent are* New Voices in American Garden Writing *and* The Border in Bloom.

Fresh foods in prime condition, uncomplicated preparations and savory combinations that emphasize the essential qualities of each ingredient are hallmarks of a new American cuisine. Featured here is a cold carrot soup garnished with fresh chives and thyme.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CREEPING THYME
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HYSSOP
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SAGE
CATNIP
MAUVE BERGAMOT
GOLDEN SAGE
RED BERGAMOT
ROSES
ROSE
FLAX
CATNIP
GERMANDER HEARTS
VIOLAS
ABBIE ZABAR ©
RUE
LAVENDER
LAVENDER
EGLANTINE ROSE ON ARBOR

An Elizabethan Herb Garden in A Seaside Meadow

Abbie Zabar

> *Scented plants inspire dreamers and those who garden on the weekends.*

My formal herb garden grows in a seaside meadow, cloistered by Nantucket's scrubby vegetation. It is geometrically precise, yet utterly romantic, incongruous, but logical. It is an evocative 16th-century design that appeared by chance, a folly to satisfy my need for poetry and order in gardening.

Most herbs grow naturally on wind-swept and sun-baked terrains. They thrive in poor soils and with little cultivation. Indeed, herbs are fit and inspiring plants for dreamers like myself, who are limited to weekend gardening.

All through the winter of 1982, my horticultural reading led to medieval and Elizabethan herb gardens. I drew planting plans, fence constructions and gate designs. The following July, a friend and I chose the site, cleared the land and double dug the sandy soil. That is easier said than done. The tangled overgrowth had become a naturalized ambush. There were thorny brambles, brittle underbrush and gnarled vines of poison ivy that had grown as thick as tree trunks.

By Thanksgiving, the house was closed for the season and we had cleared an area larger than the 30-by-40-foot space that would be the herb garden. A top dressing of manure and organic fertilizer was rototilled into the now exquisitely friable soil. The tilled earth looked like a lunar landscape as it was left to winter under a blanket of snow.

In the early spring of 1983, a local cabinetmaker enclosed the garden with a delicate, traditional New England fence. The narrowly spaced pickets created a rhythm of graceful garlands with their pointed arrow tops. The fence was left unpainted to become a weathered gray, so it would not be a visual barrier.

The orderly layout and axial arrangement of my plan is based on the form of a cross and recalls the classic arrangements typical of

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Plan for the author's garden drawn before the actual construction began. The 30-by-40 foot space was prepared and surrounded by a handmade, traditional New England fence. The garden was planted in the spring of 1983.

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ancient gardens. Historically, the cross channels represented four rivers of life that watered the Garden of Eden as well as the four corners of the Earth. Because water is such a central theme of gardens in Persia and India, the name *Chahar-Bagh*, which means a fourfold garden, is still common there. The theme of the four rivers of life is a powerful image that appears in myth, legend, poetry and art throughout Europe and Asia Minor.

Intersecting paths made of pea-pebble divide my garden into north, south, east and west quadrants. I enjoy working with the sun at my back as it circles the sky. Although a fountain or wellhead in the center would have been symbolic, this could not be a feature, as no irrigation or sprinkler system was built into the garden. In fact, for the first years, and until the plants were established, I resorted to a maze of crisscrossing hoses.

The herb garden was planned around boxwood that came from an old New England estate. This shrub has an important horticultural tradition because of its evergreen beauty and finely grained hardwood. Besides, it is easy to prune. At one time, no garden was considered complete without boxwood hedges or topiaries. It was often considered an herb and, as such, boxwood was used as a border in early herb gardens. According to legend, a planting of boxwood guaranteed long life, prosperity and a happy marriage.

My garden was sited by a pair of century-old blueberries that had grown into nine-foot trees. Two teak benches, inspired by a garden seat at Sissinghurst, were imported from England and marked the ends of the garden's north-south path. One teak bench was placed under a canopy formed by the blueberries, the only respite of shade, while the other was put in full sun. That bench was surrounded by pale green canes and alabaster buds of the White Rose of York.

Plantings of 'Hidcote' and 'Munstead' lavender define the walks and enclose the quadrants filled with drifts of gray-green herbs, the color of Nantucket itself. Lemon-scented balm and hairy hyssop, with its beautiful blue-star flowers, attract the neighborhood bumblebees and butterflies.

Lovage is there for its essential Englishness and because its height carries the eye vertically on an otherwise flat terrain, as do the spires of foxglove and stalks of angelica. Sweet woodruff grows under the bench.

Seven varieties of thyme, including a center mound of matted woolly thyme, ring the boxwood. The four quadrants have a different colored flowering bergamot from scarlet red to dusty mauve in bloom from June to September. Feathery leaves of dill and fennel support umbels of little flower heads, while dainty lacelike foliage of chervil barely shades the small gray-green leaves of oregano that creep along the sandy soil on thin purple stems. The flat, wide decorative foliage of ancient costmary brings to mind its former use as a bookmark.

Of course, there are some billowy mounds of small-leaved catnip for my furry four-legged friend Timothy, who visits me in the cool of late afternoon just around his dinner time. Sixty-six bushes of classic roses with names like 'Félicité et Perpétue', 'Maiden's Blush', 'Madame Hardy', 'Autumn Delight', 'Wind Chimes' and 'Reine des Violettes' fill in the garden spaces and weave the fence. Canes of the sweetbriar rose, the Eglantine, whose leaves smell of ripe apples, entwine the arbors that are the east and west entrances to the garden.

Outside the garden and along the fence, a miniature hedge of santolina flourishes in southerly sun. Its cool glaucous color is a refreshing reminder of the nearby foam of ocean waves. It is one foot high and 40 feet long, and is rhythmically punctuated by topiaried cones of santolina. While I designed it to mimic the classic cypress hedges that surround Mediterranean villas, I recently learned that the French once referred to this decorative and aromatic herb as *petit cyprez*. And because rosemary is not hardy in this zone, a pair of potted topiary standards become seasonal sentinels for the entry gate.

CULINARY HERB GARDENS

Rosalind Creasy

What a luxury it is to have a garden full of herbs! Even this country's best chefs usually can't match the meals created from such a garden. Imagine having enough lemon thyme or fennel to be able to use the prunings for smoking pheasant or salmon. Think of creating a salad, as if from the heart of France, with fresh tarragon and chervil, or making an elegant plate of sushi with the traditional *shisho* leaves. Fresh herbs are the signature of a chef and often a specific cuisine, yet very few markets in this country offer more than a meager selection.

When I think back on my cooking of years ago, I seem to myself to have been working in black and white and monaural. The form was there and it was enjoyable, but the depth and richness were missing. Now that I regularly use fresh herbs, I'm cooking in full color and stereo. The zip of fresh mint or the many flavors of thyme give the dishes more dimension. Twenty years ago, I started on my herb adventure by adding fresh chives to potato soup and fresh basil to spaghetti sauce. What a difference! I went on to use fresh dill

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Rosalind Creasy, who lives and gardens in Northern California, is America's foremost proponent of the edible landscaping movement. Her books include the bestselling The Complete Book of Edible Landscaping *and most recently* Cooking From The Garden.

Herbs are the easiest to grow of all edible plants. They are also a healthful way to add excitement to meals. Growing together here are two kinds of parsley and dill combined happily with calendulas in the rear.

on fish, pesto on pasta and herb vinegars on salads. Now after years of exposure to the full range of herbs, and thanks to many people's guidance, I use many more in my cooking, and almost all of them are fresh.

Herbs are the easiest to grow of all the edible plants. Another incentive is the fact that cooking with herbs can be a very healthful way to add excitement to meals. At a time when the safety of the salt and fats in our diets is being seriously questioned, it's a relief to explore enjoyable substitutes for them. I get so tired of being deprived in the effort to be "good." Using herbs is a way to deepen the pleasure as well as the healthfulness of food.

Growing Herbs

Variability aside, herbs are among the easiest plants to grow. The majority are perennial plants that need six to eight hours of sun daily, very well drained soil, little fertilizing and some spring pruning for renewal. In areas of the country where the ground freezes they need mulching, and in arid areas summer watering. Tender herbs such as rosemary, lemon grass and lemon verbena must be brought inside in the winter in cold climates; alternatively, these tender perennial herbs can be treated as annuals and replanted every spring. As a rule, herbs are seldom targeted by pests and diseases. Herbs in the South are the exception, and there, where plants are bothered by fungus or nematodes, new perennial herbs can be planted every year in a new area of the garden or in containers. Where garden soil is poorly drained, containers are also the solution; an alternative is planting in raised beds. In most cases, there are solutions to any cultural problem that might arise with herbs, and even gardeners with no yard at all can grow a few herbs on a sunny windowsill.

The annual herbs, such as basil, dill, chervil and cilantro, are grown in a somewhat different manner, as they need annual planting and better soil than the perennials. Give these herbs fairly organic soil and moderate amounts of fertilizer and water. Chervil and cilantro grow better in cool weather and are short-lived plants. For a constant supply, reseed the beds every few weeks as you would for radishes.

Herb plants can be planted in a simple dooryard cluster, in a flower border, in containers or in a traditional formal knot garden. As a rule, because they need similar growing conditions, annual herbs are at home in a bed of annual flowers and/or vegetables or clustered together. Perennial herbs grow best surrounded by other perennial flowers and herbs. For ease of maintenance, the informal cluster of perennial herbs is hard to beat. On the other hand, if a formal knot garden has always been your dream, be prepared to give continual care, as the plants will need constant clipping to look their best. Whatever your choice regarding garden design, the most important factor concerning your herb garden is how close it is to the house. All the herb authorities I know agree that the closer your herbs are to the kitchen door the more you will use them in your cooking.

Harvesting Herbs

For the average cook, harvesting herbs means a last-minute dash to the garden to pick a few leaves for flavoring. Harvesting larger amounts for preserving involves choosing a time when the herbs are at peak flavor and the plants are growing well enough to renew themselves. For the most flavor, harvest most herbs just before the plants start to flower. Another good time to harvest a large amount is when the plants need to be cut back so they can renew. A wonderful way to use large amounts of leftover prunings is for smoking. When you smoke fish or meat, place branches of green herbs such as thyme, lavender, fennel, rosemary or dill over the wet wood chips before you close up the smoker.

Preserving Herbs

Fresh herbs are best, of course, but not al herbs are available year-round, so good cook over the years have learned ways to preserve the flavors. The best ways to preserve herbs are in oil, in vinegars and by freezing. Another time-honored way to preserve some herbs is by drying.

The following directions for drying herbs can be used for borage, marjoram, mint, parsley, rosemary, sage, bay, chives, dill, thyme, winter savory and oregano.

Pick the leaves in the driest part of the day. Wash quickly, if necessary, and pat dry. Place the leaves in a single layer on a screen. For quick drying, put the leaves in an oven at a *very* low temperature (104 degrees) for a few hours. If you have more time, place the screen in a warm, dry place indoors, such as a garage or attic, and dry for five to seven days. Stir the leaves once a day. When they are dry, store in airtight containers in a cool, dark place.

Cooking from the Herb Garden

I have an amber jar of magic in my refrigerator. It's a marinade of olive oil crammed full of slices of garlic and fresh basil leaves. When I add a spoonful of this oil to an omelet or a soup I feel like Tinkerbell spreading magic dust. Presto! The dish explodes with flavor. Everyday food becomes instant decadence. Actually, *decadence*, with its negative connotations, isn't really the word, since by using this mixture instead of butter I dramatically cut down the amount of cholesterol in the dish. I spread this flavored oil on toast or in the pan before I cook a cheese sandwich. I use it with a baked potato, in a salad, or on green beans and zucchini. Preparing that little jar took, at the most, ten minutes of my time. I picked and sliced a cup of basil leaves, sliced eight or ten cloves of garlic, found a jar, put the basil and garlic in it and poured olive oil in to cover. Sometimes I make the marinade with 'Lemon' basil or 'Cinnamon' basil. I'm sure I could make it with lemon thyme or tarragon, too. No matter which herbs I use, after a week or so of letting the flavors blend, I have a half-pint of pleasure waiting for me in the refrigerator. How did I ever cook before I learned to make this mixture?

Like most Americans, I grew up with few herbs in my food, and the ones I did know were dried. According to French chef Tom McCombie, "We Americans are so used to seeing our herbs labeled 'Schilling' or 'McCormick' that we expect them to be grown in the cans we buy them in. Most of us have no idea that basil and tarragon in their fresh form bear no resemblance to the dried products. In fact, most of our cookbooks call for 'tarragon or parsley' and 'chervil or parsley'. Well, they're all green, but that's really where the resemblance ends. In France, I worked in some of the greatest restaurants and I never once saw a can of herbs. I feel that's one of the main reasons French food is so good."

I know now that I grew up not color blind but "herb blind." And in doing research for my books I discovered that cookbook publishers have unknowingly helped to perpetuate this problem in our society by discouraging authors from calling for fresh or unusual herbs in their recipes. Editors have seemed to assume that listing ingredients unavailable in markets would frustrate their users. This assumption is currently being challenged dramatically. The new chefs writing cookbooks refuse to knuckle under and are, in fact, creating a demand to which stores are responding. And, of course, more cooks are finding that most herbs are very easy to grow.

Pheasant Supremes with Honey and Fresh Thyme

The stock and sauce for this dish are prepared in advance, and the actual cooking of the pheasant takes only a few minutes. The pheasant breasts come straight to the table warm, perfectly cooked and oh-so-easy to eat. Candlelight is recommended.

It is often easiest to bone the pheasant breasts the evening before serving and let the stock makings simmer very slowly overnight. That way, only 20 or 30 minutes' worth of work is left on the way to the grand event.

Pheasant Supremes

Makes 2 large supremes; if thighs used (see below), serves 4.

1 pheasant, 2¼-4 pounds, cleaned and drawn
2 to 3 tablespoons butter, unsalted
2 tablespoons honey
2 teaspoons thyme leaves, fresh
Salt and pepper

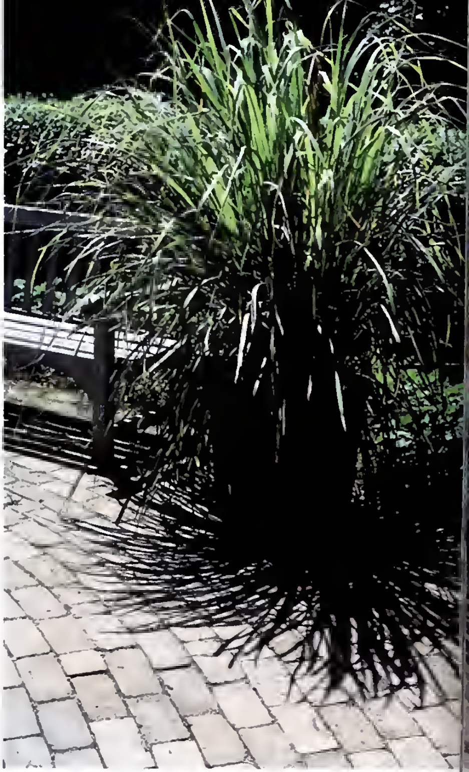
Carefully cut breasts from pheasant and remove "tenderloin" strip from back of each supreme (a "supreme" is half of the breast). Skin supremes, dry and wrap in waxed paper while you make rich pheasant stock from carcass (see below). (If desired, debone pheasant thighs and prepare in a similar manner. They will take about twice as long to cook as supremes.)

Ten minutes before serving, salt and pepper supremes on both sides. Melt butter in pan. Sauté skinned side of supreme for 1 to 1½ minutes over moderately high heat until nicely browned. Turn supreme and cook another minute. Cover each supreme with a light coat of raw honey and sprinkle thyme leaves evenly over surface.

Cook until done but still pink in the center, 2 to 5 minutes longer, depending on size. (To check for doneness, press your index finger on thickest portion of supreme from time to time while it cooks. From experience you'll learn to feel when it's done—the meat will offer resistance and spring back. First time around, though, you'll probably want to make a small knife cut and peek inside.) *Do not overcook.*

Cooked supremes can be kept warm for a *few* minutes on a plate set in a warm oven. Don't leave pheasant in sauté pan or it will overcook.

Serve whole supremes on warm plates and top with honey-thyme sauce (see below). Sprinkle on a few more thyme leaves if necessary. Accompany with a seasonal root vegetable.



Lemon grass is a tender perennial grass that will not survive winters in northern climes. It can be brought inside or alternatively treated as an annual and replanted each year. This specimen is planted in a container and overwintered indoors.

Rich Pheasant Stock

½ yellow onion, diced
1 pheasant carcass after supremes an thighs have been removed
½ bottle dry red wine
Water as needed
½ carrot, chopped coarsely
4 juniper berries
3 peppercorns
1 bay leaf
1 sprig thyme
3 sprigs parsley

Stir onion around on the bottom of a ho stock pot. Chop pheasant carcass int medium-size pieces and add to pot. Stir an turn pheasant pieces to brown the somewhat.

Add wine; then add water until liquid bar ly covers pheasant pieces. Add all other ingr dients and simmer covered for at least 3 hours, skimming surface occasionally and adding more water as needed.

Remove bones and strain stock into clean pot. Skim off layer of floating oil. Bring stock to boil and reduce volume by ⅓. If using later, cool and store covered in refrigerator. Remove thin layer of congealed fat before using for sauce.

Honey-Thyme Sauce

Makes 1 cup.

⅓ teaspoon thyme leaves
¼ cup honey
¼ cup red wine vinegar
½ cup rich pheasant stock, concentrated (see above)
1 teaspoon salt
Pepper to taste

Add thyme to honey and cook over moderate heat until honey turns dark and begins to caramelize. Add vinegar and mix well. Add stock and simmer at very low heat for 15 minutes to blend flavors. Add seasoning. Serve warm over pheasant.

Lettuce leaves alternate with leaves of basil in a decorative covering for a bowl containing tabouleh salad. The leaves also complement the taste and texture of the salad.

Tulip, Crab and Asparagus Appetizers

This dish is so beautiful it's absolutely eye-popping. And the whole thing, including the petal, is edible. I've used 'Red Emperor' tulips, but you can try any variety that has large, cup-shaped petals. As for the crab, use fresh or frozen, thawed; use canned, drained, only as a last resort.

Makes 25 to 30 appetizers.

3 ounces cream cheese, softened
2 teaspoons lemon juice
1 tablespoon minced chives
1 teaspoon minced fresh dill or mint (optional)
Dash of pepper or cayenne
1 cup (about 5 ounces) crab meat, flaked
25 to 30 fresh asparagus spears
25 to 30 tulip petals

In a medium bowl, beat cheese with lemon juice, herbs and pepper; stir in crab.

Break tough ends off asparagus. Blanch in 1 inch of boiling water in a large skillet with a lid, or steam standing upright in a couple of inches of water in a tall, narrow pot until crisp-tender, 2 to 5 minutes, depending on thickness of stems. Plunge into an icewater bath for 1 minute; then pat dry. Trim asparagus to about 5 inches; from the trimmings, cut as many ¼-inch-thick rounds as you have tulip petals. Save extra ends for salads.

Fill each tulip petal with about ½ a rounded teaspoon of crab mixture and garnish with an asparagus round. (If your petals are large and asparagus thin, you can use 3 rounds to garnish each filled petal.) Arrange asparagus in a fan on a serving platter and place tulip petals alternately (or create your own pattern).

Lavender Vichyssoise

Vichyssoise is an elegant but easy first course. Make it with blue potatoes and you'll really delight your guests. To get the lavender effect, you need to use the very deep purple varieties rather than the medium- or light-blue potatoes carried by some seed companies. The lighter-colored ones will give you a gray, not lavender, soup. The lavender vichyssoise, garnished with chives and chive florets, looks lovely in glass bowls.

Serves 6.

2 tablespoons butter
3 cups sliced white part of leeks, preferred, or 2 cups chopped white onions
3 cups chopped deep-blue potatoes
3 cups chicken broth
1 cup half-and-half
Salt and pepper to taste
Dash of nutmeg
Fresh chives and their flowers, if available, for garnish

In a large saucepan, melt butter and sauté leeks or onions over medium heat to soften but do not brown. Add potatoes and broth; cover and simmer until potatoes are tender, 15 to 20 minutes. Add half-and-half and seasonings and purée in a blender or food processor. Chill and serve cold garnished with chives and chive flowers (separate florets and sprinkle on soup).

Barbecued Vegetables

One of the tastiest ways to prepare summer vegetables is a quick and easy adaptation of the ever-popular barbecue. Although meat, fish or poultry can be a nice complement, the vegetables are so good cooked this way one is tempted to dispense with the rest.

If you are limited by the size of your grill you may have to do a couple of batches. Also consider that the eggplant needs a slightly longer cooking time than the squash and onions, and that the peppers need the least cooking time.

Serves 4.

1 cup olive oil
2 cloves garlic, crushed
¼ cup minced fresh basil or 1 tablespoon minced fresh rosemary
2 medium to large eggplants, cut into ½-inch-thick slices
2 to 4 variously colored summer squash, depending on their size (if large, slic diagonally in ½-inch-thick slices; if small, slice lengthwise in halves or leave whole)
4 small red onions, whole, or 1 large onion, quartered
2 to 4 sweet red or yellow peppers, halve and seeded

In a jar or small bowl, mix oil, garlic an herbs and let stand at least 2 hours (refrigerat if left to stand much longer). Place vegetabl slices on a cookie sheet and brush wit seasoned oil. Prepare barbecue, and whe coals are ready spread them evenly and plac vegetables oiled-side down on grill. Brus top sides of vegetables with oil and tur when first side is just starting to brown Cooking time will vary in accordance wit heat, distance from coals and size and den sity of vegetables. Over medium coals, expe average cooking time to be approximately minutes on the first side and 3 minutes on th second side, but watch carefully. Cook unti just tender; if overcooked, vegetables will fa apart. ♣

Gardens To Savor

Simple or Stately, Every Yard Deserves an Herb Garden

Ann Lovejoy

It's hard to stay indoors when spring begins to bubble in our veins, and with all the best of intentions toward spring cleaning, we are apt to find ourselves outside at the first sign of sun, poking absently in the newly warm earth, clearing away tired leaves from the firm little snouts of emerging bulbs. Cluttered closets will simply have to wait, for warm washes of thin spring sunshine and light winds carrying the scent of the waking earth lure us willy-nilly into the garden. Even if we have no garden, they are very apt to lure us to the garden center where we can buy far too many little six packs of bedding annuals.

This year, when the gardening itch sets in, make sure your nursery list has plenty of herbs on it, along with all those willing bloomers. Gardenless city dwellers whose plots consist of pots and half barrels ranged on a narrow deck high above roaring city traffic can still grow a wide range of fresh herbs to enliven summer meals and lend their fragrance to summer nights. As long as you can offer plenty of light, water and good garden soil, your herbs will flourish, even where reflected heat and wind make life hard for more delicate border or bedding beauties. Most herbs are native to some pretty tough territory, and they thrive in mediterranean conditions.

Don't feel you must grow your herbs in splendid isolation, for by and large they are excellent mixers. Simply because they are usually confined in herb ghettos doesn't mean that they deserve such treatment; herbs add cooling splashes of gray, silver and blue foliage and complex, lovely textures to typical bedding plantings. They are all fragrant, as pleasant to the nose as roses and violets (both of which may be considered culinary herbs). Herbs are incorporated, often purely as decorative elements, into some of the most sophisticated border schemes in the world. Grand or minute, gardens on every scale are improved by the addition of kitchen herbs, and it doesn't hurt the reputation of the local chef, either.

Watercress

Those who garden on balconies might consider hanging a plant panel up one wall. These are flat-backed containers made of mesh or wire, stuffed with peat moss and filled with soil mix. Starter plants can be tucked between the wires to create a floral tapestry, taking advantage of available vertical space where ground space is limited. A sunny wall could play host to an arrangement of strawberries, lemon thyme, curly creeping marjoram and honey-scented sweet alyssum,

Herbs and salad greens planted together in pots not only look attractive but can be moved around or out of the way when depleted. Nasturtiums add color to any combination and serve as edible garnishes in salads or other dishes.

with occasional tufts of miniature curry plant, *Helichrysum angustifolium* 'Nana' for contrast. A big terra cotta pot of dill, or bronze fennel edged with purple sage and blue rue would make a distinguished and practical underplanting.

Large containers or tubs can hold small salad gardens of ruffled lettuces, fern-leafed salad burnet, sorrel, chervil and chives. Run a pea net or some trellis up the wall behind your tub for scarlet runner beans, or meltingly tender purple-podded stringless beans, mingled with fragrant sweetpeas. Let mats of thyme and prostrate rosemary tumble over the sides of your barrel, and leave room to tuck in a few pots of basil. Greens and herbs that are quickly depleted can be planted separately, sinking them, pots and all, into the big container. When you use up a plant, pull out the pot and drop in its replacement, reseeding or potting up younger plants to keep a steady supply coming.

Any garden gains from the presence of a trinity of culinary sages: 'Ictarina', variegated gold and green; 'Tricolor', all purply -pink, cream and celadon; and the somber, misty purple sage. The classic, understated 'English Broadleaf', gray and trimly tailored, fits any color scheme, and adventurous cooks will

Photos by Elvin McDonald

A strawberry barrel provides a perfect opportunity to plant a pleasing group of herbs in one container. Placed by the kitchen door for convenient snipping are: parsley, rosemary, basil—purple and green leaved, variegated sage and marjoram.

chop it up with rosemary and garlic tips to flavor fresh pea soup, mince it with dill and dijon mustard for fish sauce, or blend it with thyme and marjoram to scatter over veal chops. Add honey, poppyseed and any sort of fresh sage to a wine vinaigrette and splash it over a salad of melon balls and ham.

Fruit salads and cantaloupe are all the better for snippets of aromatic pineapple sage, a plump, matronly creature that takes to the contained life on terrace or deck with panache. Her stalks of clear red flowers are highly attractive to bees, and hummingbirds will squabble and jostle for their lilliputian lion's share of the nectar. The screaming red sages known euphemistically as "ornamental" are seldom an ornament to any garden, but the cooler toned blues, whites and silver of the farinaceous salvias, such as 'Victoria' in dark-night blue with white-powdered stems, and the ice pale 'White Bedder', are graceful anywhere. Scads of gray and silvery foliage plants fill out this vast tribe, which is worth thorough investigation.

French tarragon is a lovely, lacy herb with a thousand uses; add a sprig to white wine vinegar and let it steep in the sun for a few days, scatter shredded fresh leaves over broiled or boiled chicken, or snip some into your usual salad dressing. Add chopped tarragon to fresh lemon juice, garlic and olive oil, then marinate swordfish or halibut in the mixture for a few hours before grilling over maple, alder or hickory coals. Sprinkle it, minced, over corn on the cob. Purée a big handful of fresh tarragon with a fat shallot, some walnut oil and white wine vinegar, a bit of orange rind and freshly squeezed juice to make an intensely scented and savory sauce for lamb or lean pork medallions. *Artemisia dracunculus* is the proper name of this creature, and it, too, has a score of ornamental relatives with filigree foliage to add a soothing shimmer of silver to the hot summer garden. Not all of them are quite the thing for salads—they include the bitter herb known as wormwood, and the rather musty one that lends its characteristic flavor to absinthe. Still, all are beautiful, and their leaves have a wild, pungent scent, immediately transporting to those who know the desert.

Gather an armload of basils when you visit a garden center, for they come in several colors and a dozen forms, some exotically scented, all wonderful in the kitchen. For an all-purpose culinary basil, try *Ocimum basilicum* 'Lettuce Leaf', a robust Italian variety outstanding for its big, flavorful

Lamb's ears, Stachys byzantina, *adds a silvery color and texture to a border of mainly green herbs and other perennials. So often the contrasts in color and foliage texture help to point out the unseen attributes of many favorite herbs.*

leaves. 'Purple Ruffles' looks just like it sounds, and is quite easy to grow, unlike other dark-leaved basils. This one is a handsome companion for shrieking pink petunias and looks elegant tucked between arching silver-blue sprays of giant catmint. Thai basil has sharp, spicy overtones, while lemon basil, although it has a marked lemon scent, tastes more of basil than citrus.

For the diet conscious, a savory low-calorie pesto may be made by adding a big scoop of low- or non-fat yogurt to a handful of fresh basil and a few cloves of garlic; buzz in the blender till smooth. If you don't mention the substitution, nobody will ever even notice, and it's great with hot pasta or chilled salads of steamed vegetables. A handful of toasted nuts—whether hazelnuts, walnuts, almonds or the more traditional pine nuts—makes a thicker, richer pesto, and grated parmesan or romano cheese is another tasty, though optional, addition. Add a spoonful of pesto to your usual salad dressing, or put olive oil, garlic and balsamic vinegar in the blender along with a generous handful of fresh basil to make a brisk and aromatic dressing for greens or new potatoes. Since a few rounds of pesto can do in even a good-sized plant, grow basils in small pots that can be pulled out of an ornamental border or a large container garden, where a mangled plant could look less than lovely. Pot up any extras and keep them waiting in the wings as reserves, or replace them with new plants, whether herbal or ornamental.

Basil isn't the only herb for pesto; fine versions can be made using other herbs, too. Try stuffing a whole salmon with a pesto of fresh dill and garlic, or baste a roasting chicken with a pesto of chervil and chives. Lean pork or lamb will stand up nicely to a pesto of fresh fennel and red onion. Use your imagination, and play around with your favorite herbs in combination as well. Those who love *cuisine relevé* will be particularly taken with a pesto of cilantro, the spicy herb that gives its bite to the cooking of South America, China and Asia.

Chervil has a big, bold flavor that definitely does not appeal to some, but the smitten can't get too much of it. To experience this herb to the fullest, purée an entire bunch (washed and trimmed) of fresh cilantro with garlic and a hot chile pepper or two. Thin with olive oil as needed to make a smooth paste, which can be mixed with ricotta and chopped fresh spinach to fill phyllo dough, or blended with sour cream or yogurt for dips. Spread cilantro pesto on a thin dough crust, then sprinkle lightly with grated pecorino and mozzarella; bake this in a very hot oven for an unforgettable pizza.

There are few plants more striking than a huge pot full of well-grown finocchio, the bulb-forming sweet fennel adored by the Italians. In early spring it is among the first plants to appear—a foaming fountain of lively green froth. By summer it becomes huge and architectural, with great feathery arms of finely dissected foliage. In fall it is a tower of soft copper and gold. Each tiny leaf will hold a shimmering drop after a rain when any stray sunbeam can suddenly set the whole plant aglow. The Italians favor braised fennel with cheese sauce, a combination personally find disgusting. For my money fennel is born to be sautéed with baby zucchini, pattypan squash and crisp young beans thinly sliced on the diagonal. The leaves may be strewn over grilled fish steaks or sliced tomatoes with equal felicity. They will also grace a salad of leeks and slim, waxy yellow finn potatoes dressed with a mustard vinaigrette.

Travelers in France will recognize the tart tangy flavor of sorrel as a common one in French spring salads. The French deserve credit for elevating sorrel from a rank wrenchingly sour weed into a gastronomic triumph. Young sorrel leaves are wonderfu chopped into salads, tuna or chicken sandwich filling, and soups of tiny early vegetables. Sorrel can be sautéed until limp then blended with crème fraiche and a few green peppercorns and tucked into a light, puffy omelet. An astonishing spring soup can be made by melting the sorrel in butter over gentle heat until soft, adding scalded milk (which will promptly curdle) and buzzing it smooth in the blender. Return the soup to the pan, add lots of cooked shrimp and thinly sliced green onions, then crumble in some crisply cooked bacon. Garnish this with sour cream and lots of freshly ground pepper.

A handful of lemon balm makes a delightful tea, hot or iced, and the finely chopped leaves are a refreshing addition to mixed green or fruit salads and cold soups. Chop a few leaves of lemon balm and mint together and freeze them into your ice cubes to freshen up frozen lemonade or instant iced tea. Planted in the ground it earns a bad reputation for rampant spreading, but in pots, its rowdy ways are checked. A form with warm yellow leaves, called 'Allgold', has better manners and the same appealing fragrance. Try planting 'Allgold' in the front of a potful of dusky red 'Rubine' brussels sprouts with purple sage and golden thyme, or give a big clump an underplanting of variegated mint with leaves shaded in cream and tender jade green.

Mint, though highly ornamental, is another vigorous, not to say flagrant runner that is best confined to pots. Mints are indispensable for enlivening everything from juleps and fruit soups to fresh chutneys and raitas. Some hot summer night when appetites are depressed, grate up a cucumber, drain it for a minute or two, then stir it into a dish of yogurt. Squeeze in a clove of garlic and add a handful of minced mint leaves. The result is a raita, an Indian side dish that makes an enticing addition to midsummer meals. Serve it with cold chicken or grilled fish, or spoon it over a salad of artichoke hearts, fresh mozarella and walnuts, all tucked into split pita bread rounds.

Mints, like basils, come in various sizes and scents; apple mint or pineapple mint, orange mint or coconut-flavored and the curious 'Herba Barona' that smells of caraway and roasting beef are but a few of them. Everybody knows about mint tea, but plain spearmint, uplifting as it is, isn't the only game in town. On cool summer mornings before the sun is fully up, take the teapot with you as you wander through the garden. You can develop your own wake-up blend of mint tea by adding a sprig of several mints, a spray of lemon balm and a few jasmine flowers. Later in the season, combine orange mint, spearmint and mashed, ripe rosehips for a tangy, sweet-tart brew. To make any sort of herb tea, put a handful of herbs—perhaps a quarter of a cup, loosely packed—per person into the teapot. Cover with boiling water and steep for three or four minutes. Strain, and serve plain or with honey.

Few people ever buy chives for this ubiquitous herb lines garden walks from one end of the country to the other, and it is one of those beloved garden plants that always gets swapped over the back fence. This is just as well, since its name, *Allium schoenoprasum*, ought never to be attempted out loud, particularly at the local garden center, where the staff is quite likely to gawk at you and call the manager, who will eventually say, with dawning intelligence, "Oh, you mean chives?" Chives make fat, grassy clumps that can be sliced up with an old knife into as many divisions as you need each spring. Once you have it for a few years, you too will be passing bits of it over the fence to new neighbors. The fluffy lavender flower heads add a piquant touch to mixed greens, float in cold summer soups, or decorate potato salad. Even prettier are the delicate, fragrant white umbels of garlic chives (*Allium tuberosum*), the leaves of which add equal snap to salads, sandwiches and omelets.

This summer, look at your herbs with a fresh view. Let the herbs mingle freely with ornamentals of all persuasions to enrich your garden with their fragrance, color and texture. Don't worry if it feels odd to juxtapose bright blossoms with edible foliage; after all, any combination you try is bound to be in unimpeachably good taste.

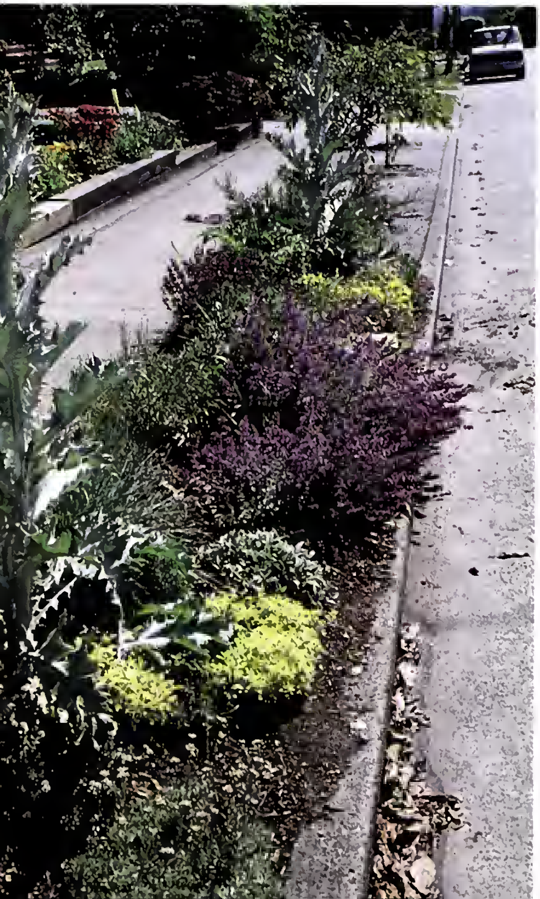
Herbs by Curbs

Jerry Sedenko

The traditional place for herbs is in a special garden, usually formal in design, where their needs for sun and good drainage can be met. However, once these plants are freed from formal confines, their purely ornamental virtues become more apparent. And their tough constitutions make them naturals for beautifying difficult situations. The chinks in a retaining wall or a steep bank, particularly if the soil is sandy, can be such a situation. Since herbs are generally thrifty plants, even small nooks and crannies are likely spots for them.

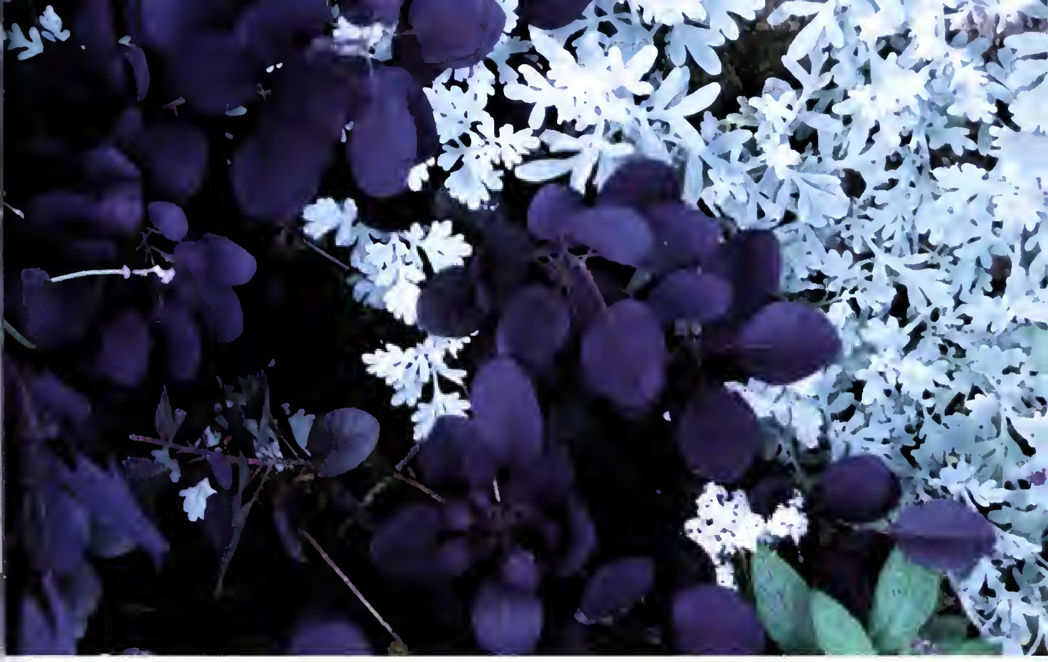
One of the least-gardened and most perplexing areas of any urban or suburban situation is that two- to four-foot-wide plot o ground between the sidewalk and the cur known as the parking strip, tree lawn, o parkway. A pathetic patch of grass is the usual fate to befall this stepchild of the garden. Sometimes ivy or another ground cover i planted. But as time goes by the plants look increasingly forlorn, and the frustrated homeowner turns to the Ultimate Solution paving.

Why not try herbs and like-minded plants as an undemanding and beautiful alternative First check with the "powers that be" to learn what the local ordinances say about the lega uses of the strip. Existing small trees can b surrounded by beds of lemon or silver thym and edged with low-clipped hedges of santolina or lavender. Or why not go in for touch of Sissinghurst Castle and make thyme lawn, composed of a collection o mat-forming varieties of *Thymus serpyllum* Woolly thyme (*T. pseudolanuginosus*) make a soft gray carpet very quickly, and is beautiful between paving squares or steppin stones. The bits that grow over the edge smell delicious when trodden upon. But i



One of the least-gardened and most perplexin areas of many urban locations is the two- to four-foot wide plot of ground between the sid walk and the curb known as the parking stri Photographed here is the author's solution to this problem. Starting from the front: Antennaria dioica, *thyme, catmint and a salvia—a pleasant mixture of colors and textures.*

Jerry Sedenko lives and gardens in Seattle. He is a garden designer whose writing has appeared in Fine Gardening *magazine and* New Voices in American Garden Writing.



Cotinus coggygria *'Royal Purple' has purple leaves that combine dramatically with* Artemisia *'Silver Brocade'.*

you wish to make the parking strip truly a garden, a mixture of herbs and other lovers of benign neglect is the way to go.

Because this area is an island, you needn't worry too much about the design. Think of it as a place to indulge your "I must grow one of those" fantasies. The reason you can get away with this is that virtually any combination of herbs you can come up with looks good. Many herbs have small gray-green leaves with soft textures, some being downright furry. Mixing these with other plants of similar color but different size leaves creates an easy variation on a theme. For a really large scale effect, a few Scotch thistles, (*Onopordum acanthium*), cardoons (*Cynara cardunculus*) or mulleins (*Verbascum* spp.) will add variety, particularly when they bloom with their six-foot spires and candelabras.

Mid-sized plants to consider are *Senecio* x 'Sunshine' (*S. grayi*), various forms of Scotch broom (particularly 'Lilac Time' and 'Moonlight'), and either forms of silverberry (*Elaeagnus pungens*) or rockrose (*Cistus* spp. and hybrids), depending on the severity of the climate.

Variegated lemon balm provides a background for the blossoms of a lavender campanula. Most gardeners have not yet discovered this pleasing combination.

For a spiky or vertical line to serve as counterpoint to all that soft texture, consider irises. There are many kinds of irises and iris relatives that thrive in such a situation, from the hardy bearded hybrids, to that charming midwinter bloomer, *I. unguicularis*. Sisyrinchiums of all sorts are good bets, particularly *S. convolutum* (golden-eyed grass), and *S. striatum*, with its upright wands of cream-colored starry flowers. One of the most subtly striking plants for this effect is evergreen oats (*Helictotrichon sempervirens*). It forms two-foot-high hummocks of steel-blue grass blades, topped by graceful, arching seed heads up to five feet high. Investigate some of the other grasses too. A plant that looks like a giant grass but is in reality a lily relative is New Zealand flax (*Phormium*). In mild climates, the colorful smaller varieties provide a strong architectural note. They come in red, glaucous and golden shades, plus all manner of variegations. Lily-of-the-Nile (*Agapanthus* spp.) has tufts of green strap-shaped leaves, and in midsummer sends up two- to four-foot stems topped with large drumstick clusters of rich blue or white bells. The 'Headbourne Hybrids' are the hardiest sort; at least one gardener in the Great Basin buries the bulbs over a foot deep, where they survive temperatures of at least minus 10 ° F.

In the range of 6 to 24 inches high you might try 'Jackman's Blue' rue, sometimes sold as 'Blue Mound', a particularly fine form of *Ruta graveolens. Origanum dictamnus* (dittany of Crete), Australian mint shrub (*Prostanthera rotundifolia*) and the smaller rock-roses, such as *Cistus* x *skanbergii*, plus some of the shrubby veronicas (*Hebe* spp.), are good bets in mild-winter areas. They are all evergreen, or perhaps ever gray is more apt. Where the climate is less benign, try the variations of sage (*Salvia officinalis*). The common one is a good doer, as is the yellow-edged variant ('Icterina'). However, the purple-leaved and tricolor forms are a bit less beneficent. There is a lovely sort with extra-pale fuzzy leaves which is particularly striking. The lavenders seem particularly suited to an ornamental assortment of herbs, with their varying heights, grayness and color and form of flowers. English lavender (*Lavandula spica* or *vera*) can become a genuine shrub, up to four feet in time, but the dwarf forms, of which there are several, can easily be tucked in here and there or used as edgers. Try 'Munstead', with early lavender-blue flowers, or 'Hidcote', very dwarf, with deep purple flowers. French lavender (*L. dentata*), with its toothed gray leaves, and Spanish lavender (*L. stoechas*), whose flower spikes are topped with inch-long purple or white pennants, are more tender, but are easily propagated from cuttings and worth overwintering indoors. Rosemary (*Rosmarinus* spp.) has many forms, from rigidly upright to six feet to totally prostrate. The latter look beautiful draped over a retaining wall. Many are hardier than might be expected, and the needlelike foliage always looks fresh and healthy. Some types, notably the upright 'Tuscan Blue', have particularly beautiful blue flowers.

All of the wormwoods (*Artemisia* spp.) are beautiful and undemanding, and are among the most charming silvery plants to be found There are two basic types: those which spread by underground shoots, and those which stay put as clumps or shrubs. In a large space the running types can be used, but they have a tendency to be thugs. Some of the bes are 'Silver King', 'Silver Queen', and 'Lam brook Silver', all upright, and 'Valerie Finnis somewhat of a flopper. The clumpers are represented by that old standby 'Silver Mound (*A. schmidtiana* 'Nana'). It makes quite a lovely little tuffet of silver threads until i flowers, at which point it definitely looks a if it's stayed too long at the party. *A canescens*, on the other hand, is far mor substantial when it bears its wands of littl yellow buttons. Aside from this attribute it makes the most charming tangle of low spreading tattered lace. But the best of the stationary wormwoods is the result of a cros between *A. arborescens* and *A. absinthium* known as 'Powis Castle'. This is the ultimat in silver filigree, and its graceful lax hab makes the two- by four-foot shrub all the more winsome. As a bonus, its hybrid origin means it doesn't flower at all, so it looks beautiful all season. A product of the same union called 'Huntington Gardens' is beginning to make its appearance. It's similar, but more definitely upright-growing. Look for it.

The lavender-cottons (*Santolina* spp.) are real workers. The most common is *S. cham- ecyparissus*, and its dwarf form, 'Nana'. Left o themselves, they grow into mounds of ray, rough, finely divided foliage, until they lower. Not only are the little button flowers charmless shade of mustard, but the bushes lop open from the centers rather embarrass- ngly. If they are closely clipped in May, both hese situations can be avoided. Also, with ny of the santolinas, after they've been lipped back hard, try placing a "cage" of mall chicken wire over the plant. As it re- rows through the wire, the wire will be ob- cured, and you will have a flop-proof plant. his is particularly advisable when using san- olinas as dwarf hedges. Other kinds to look or are 'Bowles' Variety', with gray leaves and ool, pale yellow flowers, and *S. virens*, with reen foliage and similar sulphur-yellow lowers. Faster growing than *S. chamaecy- arissus*, *S. virens* is tolerant of a bit more vater, and is even fire retardant, to boot!

No ornamental herb planting is complete vithout at least one of the catmints (*Nepeta* pp.). The most common, *N. mussinii*, or *N.* *faassenii* (there is confusion in the trade), s a real champ when it comes to fast growth nd length of bloom. In one season, a two- nch potful can easily spread to 18 inches cross and will bloom from April to Novem- er. If it flags, cutting it back hard and giving t a dose of water will have it up and bloom- ng again in just a few weeks. For reasons nown only to them, cats are particularly ond of this plant. They love to loll about in . This can wreak havoc if your neighbor- ood has a particularly dense feline popula- ion, despite the sturdy constitution of the lant. One time-tested solution is to place horny twigs, such as rose or barberry, among the leaves. There is a larger growing form called 'Six Hills Giant', similar to the common type in every way except size; it can reach two feet, easily double the height of the smaller one.

Under all this herbage should go the many ground-hugging mat formers. The above-mentioned thymes are ideal, as are golden marjoram and pussy toes (*Antennaria dioica*). The pink form of pussy toes is a delight when the clusters of fuzzy little nubbins hover a few inches above the dense, even carpet of half-inch gray leaves. These sorts of humble plants not only put the finishing touches on the picture, but help keep weeds at bay. Remember, if you don't cover the ground, Mother Nature will make every attempt to do it for you, and you might not like her choices.

Here and there it's nice to have a few clusters of bulbs peeking out. All that gray foliage sets off their bright colors to perfection. Also, many bulbs are native to the same regions as herbs and are therefore easy companions. The minor bulbs, such as species crocuses and tulips, muscari and anemones do particularly well, as do the smaller narcissi. They multiply reliably, thriving in the same baking sun and meager soil that are best for herbs. And tufts of bright little bulb blossoms in the early spring are so cheery that their diminutive size is more than made up for.

So, now that you're committed to doing something creative yet practical, how do you do it? First you must get rid of that grass. Soak the soil well, if it is not spring, to get it growing. Then, on a warm day, break out the systemic, non-residual herbicide. There are other non-chemical ways to kill the grass, such as covering it with black plastic for several months, but be aware that no matter what, there will be grass and weed seeds left behind that will germinate. Ideally, till the ground after the grass is dead and water well to force the culprits to appear. Keep after them.

After loosening the soil there will probably be a certain amount of mounding. It means

Lavender-cottons, Santolina *spp., grow into mounds of gray, rough, finely divided foliage. Keep closely clipped in May and the bushes will not flop over and become untidy. The flowers are yellow and buttonlike.*

that there is more air in the soil, which wil also cause it to be warmer. Also, excess wate will drain better than it did when it was trodden, a condition that is critical for health herbs.

Place your plants in a pleasing arrangement. Groups of two or three of a kind wil keep things from looking spotty. Space th taller things in a way that will create a rhythn of plant heights. Don't bother to add any fertilizer, unless there's something wrong wit the soil. A bit of time release fertilizer place in each planting hole will help get things o to a good start, and the gradually decayin tilled-in turf will give a little nourishmen later. But remember, these plants thrive on skimpy diet.

A two-inch layer of mulch will insure th any remaining weed seeds have a rough go o it. By the second year your plants should b a soil-covering size, and the battle of the wee will be reduced to minor skirmishes. Wate moderately but regularly for the first sever weeks after planting. In the second and su ceeding years, supplemental water will b needed rarely if ever, depending on the plan chosen and the climate. In a surprisingly sho time, you will have a genuine garden, le demanding and far more beautiful than wha was there before. And you're guaranteed t be the talk of the neighborhood.

Found At Last
Real Oregano

Dorothy Hinshaw Patent

My husband and I love Mediterranean food—hearty pastas, spicy moussaka, and other flavorful dishes that call for plenty of oregano. But when I tried to grow my own oregano, I stumbled on an herbal mystery.

First I ordered seeds of *Origanum vulgare*, which the catalogs described as "true oregano." But the plants I grew from them, with their lovely purple flower spikes, neither smelled nor tasted like store-bought oregano. In fact, nobody could taste them at all! After years of ordering "true oregano" seed from different catalogs, and growing out handsome purple-spiked bushes with no flavor, I began to wonder if it was me or my soil.

Bonnie Fisher of Hickory Hollow Herbs in Peterstown, West Virginia, said that the problem was that *Origanum vulgare*, the oregano sold by most seed companies, isn't oregano at all—it's wild marjoram. Culinary oregano is *Origanum heracleoticum* and has white flower spikes and that true pungent flavor. Ms. Fisher grows both kinds, using culinary oregano in the kitchen and the purple flower spikes of *O. vulgare* in herb wreaths. For culinary oregano, she recommended buying plants, not seed.

riganum vulgare, *top, is often described as*
'al oregano. However, Origanum heracleo-
cum, *at the bottom of the photo, is the*
linary oregano that has the true pungent
vor.

Dorothy Hinshaw Patent is a biologist who has written numerous science and nature books for children. She is the coauthor, along with Diane E. Bilderback, of Garden Secrets *and* Backyard Fruits and Berries, *both published by Rodale Press.*

"Culinary oregano has a tendency to revert, to be cross-pollinated when it goes into flower," says Sal Gilbertie, owner of Gilbertie's Herb Nursery in Westport, Connecticut, a wholesaler who supplies plants to the National Herb Garden in Washington, D.C. At Gilbertie's each plant is field-tested for fragrance and flavor, and only the best are chosen for cuttings. But isn't there any way to get culinary oregano from seed? "Greek oregano has the oregano flavor," said Gilbertie, "but it's much stronger, sharper—it bites the tongue." He mentioned that there are three subspecies of Greek oregano, but they all have the same pungent flavor.

I started combing the catalogs again, and two years ago, I found Greek oregano listed in the Richter's Herb Seed Catalog, which announced that its seeds were "true oregano, collected wild in the mountains of Greece." Eureka, I thought, this *has* to be the stuff!

That spring, I planted the Greek oregano seeds indoors. They took a long time to germinate and came up sporadically. The germination rate was low, but I didn't despair—I'd gotten six transplants from my experiment. In June, I planted the seedlings in the garden. They survived but grew slowly until mid-July, when things warmed up a bit. (Western Montana, where I live, is a far cry from the Mediterranean!) I found that placing flat rocks around the plants helped them along.

The Greek oregano plants resembled *O. vulgare* in leaf shape only. My specimens were small and grew close to the ground, with their modest stems hugging the soil. The seedlings varied quite a bit in size and form, but they all shared one important trait—leaves which were delightfully fragrant, the way oregano should be!

When fall came, I potted up my herb plants, now about four inches tall, and brought them into my attached greenhouse for the winter. In the spring, I replanted them in the garden, where they produced small, rather loose stalks of white flowers along with their zesty leaves.

I planted more seeds of the Greek type outdoors in midsummer. I plan to keep growing this oregano every year, maintaining some plants as perennials and harvesting others for their leaves. Because of my harsh climate, I have to baby the plants along, covering them in winter (real oregano is not as hardy as the common kind) and planting them in the warmest, sunniest parts of my garden. But, thanks to my determination (and love of mystery), I'll have my own garden-fresh oregano whenever I need it—found at last

Seed Sources for Oregano

Otto Richter & Sons, Ltd.
Goodwood, Ontario
Canada LOC 1AO

Johnny's Selected Seeds
Albion, ME 04910

Plant Sources

Hilltop Herb Farm
P.O. Box 1734
Cleveland, TX 77327

The Sandy Mush Herb Nursery
Rt. 2, Surrett Cove Road
Leicester, NC 28748

Sunnybrook Farms Nursery
9448 Mayfield Road
P.O. Box 6
Chesterland, OH 44026

Well-Sweep Herb Farm
317 Mount Bethel Road
Port Murray, NJ 07865

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DOUBLE VISION

arden Sage
lvia officinalis

Linda Hillegass

I'm not sure why I have an herb garden. It isn't that I really use the herbs all that much. Oh, the parsley, of course, and the chives, the occasional snippet of black peppermint in iced tea. I did season the stuffing for one memorable Thanksgiving turkey with frosty sage plucked from a half-frozen garden. But I've grown thyme and oregano for a decade without tossing them in a sauce. My garlic chives are glorious, lush in summer and enchanting in fall with their starry blooms. But I've yet to try their leaves among salad greens. I go right on buying those bottled herbs at the grocery store just as if I had no herb garden at all.

The truth is that my herb garden is a sensuous experience that has to do with scent, sight and texture far more than with taste. I love the silvery green of sage as a background for darker colors like the deep green of chives that produce a shower of lilac, cloverlike bloom in spring. My black peppermint mats the ground in a thick, rich and completely satisfying way. When it strays beyond its bounds I enjoy pulling up its pungently scented runners. The drift of aroma from a thyme plant brushed while weeding is earthy and exotic like a fresh wind from Greece.

Linda Hillegass lives and gardens in Lincoln, Nebraska, where she is also co-owner of a bookstore. "Double Vision" is reprinted with permission from New Voices in American Garden Writing, *published by Capability's Books. Her writing has appeared in* Fine Gardening *and* Nebraskaland *magazines.*

I can't think of a part of my garden I enjoy more than my patch of herbs and lately it's become one of my true successes, too. My great love is flower gardening. I spend hours and dollars and sweat on it, but I'm sorry to say that the garden in midsummer seldom lives up to my hopes for it in January. My failures are all too frequent. I've developed a philosophical outlook on these disappointments since taking up garden photography. I begin to see just how the illustrations in garden books can look so lovely. It's all a question of angle, foreshortening and focus. Those seemingly perfect gardens no doubt have their share of gaping holes.

But success is mine in the herb garden, at least since I hit upon the idea of interplanting bulbs and spring flowers among the perennia herbs. Early in my career as an amateur herbalist, I made the usual mistake of planting to closely. It was a natural error. In spring th gaps around a tiny oregano plant and pruned thyme loomed large. Closer plantin gave the herb bed an established look in May but later in the season this approach create havoc. Reveling in the sunny site and the hea of a Nebraska summer, the herbs ran riot.

The beautiful, green finely dissected leaves of parsley work well with many other plants. The author often mingles spring-flowering bulbs between her herbs.

Photos by Elvin McDonald

Now among more widely and properl spaced herbs I insert bulbs and other sprin flowers to fill the gaps. Their foliage die away to make room for the vigorous summe growth of sage, oregano and parsley. I'v planted daffodils between a well-establishe sage and a big clump of chives. In earl spring, when the daffodils rise along with th temperatures, I prune the sage sharply bac to give space to the bulbs. By the time the da fodils have finished blooming the sage ha put on new growth and begun to fill i around and over them, hiding their withe ing leaves.

The plantings, designed to create a sprin wave of bloom, give heavy emphasis t daffodils—lovely orchidlike white 'Thalia and gloriously sunny 'King Alfreds', as we as a few mixed nonentities. Since daffodi return reliably year after year and even i crease, they provide a reliable backbone f the garden's early season. The remaini springtime spaces are filled with a sprinkli of tulips, a pair of bleeding hearts (*Dicent spectabilis*), yellow columbines, perenni gold alyssum, and white candytuft (*Iber sempervirens*).

The tulips were bought cheap at the dru store after years of hard luck with expensi tulips which bloomed splendidly one seas only to languish a second year and fizzle o completely by a third. The drugstore bargai were to be disposables, bought with the id of discarding them after a season or two bloom. Ironically, they have lived on a bloomed lustily for years. They were label "mixed," which I took to mean red, purp

ontainers are often the answer to extending he short growing season in northern climes. ombined here to charming effect are: parsley, ansy, English daisy and sweet alyssum.

ellow, pink and so on, but one batch of them ame up all white. Planted near the white Thalias' they created what I at first regarded s an unfortunate color association. Still I ave come to admire this white on white look nd enjoy the lovely bridelike bouquets I can ull from this garden in spring, sometimes ith the addition of a few branches from a earby apple tree.

The overall springtime effect of delicate hite and yellow blooms with a dash of pink rom the bleeding hearts and an accent of red rom a few of the tulips is quite breathtaking. ometime between late March and mid-April is combination bursts into bloom in unison nd lasts a few days to a few weeks, depend- g upon how quickly the hot winds come. he garden appears almost solid with daf- dils and their compatriots at this point, the erbs, hardly noticeable.

Tucked up against the stone wall of the arage, with a fence on its southern side, my erb garden has a western exposure that gives a sunny site while still protecting it from the ll blaze of the sun that scorches plants all too easily in a Nebraska July and August. The bed is large—an elongated triangle about 32 by 30 by 12 feet—with plenty of space for a liberal use of bulbs and spring plants that return year after year. Interplanting, though, seems just as suited to a tiny plot outside the kitchen door where, among half a dozen plants of parsley, thyme and chives, one might tuck a few crocuses or species tulips.

After the glory, of course, comes the gore, when the lovely spring bloom dies away, leaving the trashy fading foliage of daffodils, the flopping tulip leaves, the withered bleeding hearts. But this period is not forever. A second wave of bloom in late May and well into June helps to hide the leafy remnants. Yellow columbines and orange poppies set off the blue of Siberian iris and the blue-to-purple range of herbal blossom just coming on: lavender chives, blue sage and purple-blue catmint.

Excepting only the columbines, the gold alyssum, the candytuft, and the Siberian iris, all of these flowers die to the ground shortly after they bloom. The trash withers away, the herbs expand into the holes left behind, and by midsummer I can smugly survey the thrifty, sweet-smelling, bee-busy herb garden which has magically replaced my springtime fairyland. ❦

The Big Three Herbs For The Home Garden

Doc and Katy Abraham

Parsley
Petroselinum crispum

What are the three best herbs for th home gardener? Here are ou favorite candidates:

1. Basil. There are over 40 known varietie of basil. Of all the herbs, basil is one of th easiest to grow and most useful. Start plant from seed indoors, harden off around Ma and plant 12 inches apart in full sun. Basil prefer a soil high in organic matter. We till ro ted leaves into the soil each year to hol moisture in dry weather.

Ocimum basilicum 'Citriodorum' (lemo basil), pale dull green foliage and a stron lemony smell. We like its compact, bush habit.

O. basilicum (anise basil), purple foliag white flowers, sweet anise flavor.

O. basilicum 'Crispum' (cinnamon basil white flowers and a cinnamon flavor.

O. basilicum 'Green Ruffles', whi flowers, plus handsome lime-green foliage- an excellent plant in borders or in pots.

O. basilicum 'Purple Ruffles', very show in annual beds and borders, or in pots. E cellent in vinegar and as a garnish.

O. basilicum 'Purpurascens', deep purp with shiny foliage and lavender flowe Useful in vinegar and as a garnish.

Doc and Katy Abraham have run a successf commercial greenhouse and landscape busin for over a quarter of a century. They teach horticulture at the Community College of the Finger Lakes. They also write a self-syndicate garden column and produce their own radio a TV garden show.

O. basilicum 'Dark Opal', shiny purple foliage, useful in vinegar and as a garnish.

O. gratissimum, yellow-white flowers and gray-green foliage with strong clove scent and spicy flavor.

O. sanctum 'Holy Basil', lavender flowers and a gray-green coarse foliage, sweet fragrance. Highly ornamental but not used in cooking.

Our way to preserve basil:

Wash the leaves and roll them into a cigar shape (while wet) and wrap in aluminum foil. Place in the freezer. When we want to use some, we simply unroll the foil, slice off what's needed and reroll and refreeze the remainder. Loose leaves can be placed in a plastic bag and frozen.

Another method recommended by Nichols Nursery consists of using an equal amount of basil leaves and grated parmesan cheese. Chop basil leaves in a food processor. Stir well with the parmesan and store in efrigerator for two to three days so that the lavors are blended. Great for fresh or cooked tomatoes, salads and pastas. Place in plastic cottage cheese containers to freeze.

Basil can be stored in oil, vinegar or as a rozen paste. Basil can be dried and stored in ightly sealed glass jars.

2. Oregano. *Origanum vulgare.* Order eeds from a reputable seedsman. We start our seeds (very tiny—130,000 per ounce) in Pro-mix (soilless mix). Sow thinly, keep moist nd at 72 degrees F. Most oreganos germinate in five days or so. Separate plants into pots nd, around Memorial Day, put plants in arden. Harvest the leaves as the plants grow. In fall, we pull up the plants and hang them in our garage to dry.

Home-grown oregano often lacks flavor. Don't start harvesting until flowering begins. ests show that flowering doubles the concentration of oil in oregano leaves, making them most flavorful late in the season. The pposite is true for nonflowering oreganos in which leaf oil concentration rises steadily in the spring but drops off in fall. Even at their late spring peak, leaf oils in nonflowering plants can't match the autumn levels in flowering oreganos.

3. Parsley. Parsley can be grown as a garden plant, or in the kitchen window all year long. This herb is full of vitamins, high in chlorophyll—a natural breath sweetener. Parsley seed is difficult to germinate, and seedlings difficult to transplant. Always use fresh seed. The seed has a natural inhibitor on the coat so soak seeds in warm water to wash off the chemical inhibitors and hasten germination. If sown outdoors, pour boiling water over the row of seeds before covering. We start our seed in Jiffy Pellets, three or four per pellet, and set out pellet and all. Grow in full sun.

There are two kinds: the flat leaf or Italian parsley (*Petroselinum crispum* 'Neapolitanum') and the curly leaf. The flat leaf has more vitamins, a stronger flavor and is ideal for drying or freezing. The curly leaf type is prettier, tastier. You can use parsley for almost any foods except breakfast cereals and sweets. Digging up a clump of parsley in fall and bringing it indoors in winter is not a good way to start new plants. Parsley has tap roots and so does not transplant easily. Start new plants from seed. To us, dried parsley tastes like hay. We prefer to pull up the stems, wash sprigs and foliage and roll into a "cigar." Wrap with aluminum foil and freeze. It stays green and fresh. ◆

Drying Herbs in the Microwave:

Wash sprigs, pat dry with paper towels. Remove leaves from stems and measure two cups of foliage. Spread evenly on double thickness of paper towel. Turn microwave on high for four to six minutes. Stir several times during drying. When fully dried, herbs will be brittle and will rattle when stirred. Store in fruit jars or airtight containers in a cool, dry place.

Parsley is full of vitamins, high in chlorophyll and pretty to look at. It is easily grown either indoors or out.

Photos by Elvin McDonald

Oregano seeds will germinate in five days or so and can be planted out in the garden afte Memorial Day. Harvest only after flowering begins for fullest flavor.

Of all the herbs, basil is the easiest to grow and the most useful. There are more than 40 known varieties from which to choose. Start seeds indoors for later planting in the garden.

Please Don't Pass The Salt!

If you're on a low-salt diet, use the three herbs together as a salt substitute.

One mixture consists of two teaspoons of garlic powder and one teaspoon each of basil, oregano, parsley and powdered lemon rind . . . or dehydrated lemon juice. Put the ingredients in a blender and mix well. Add rice to the mixture to prevent caking and store in a glass container.

For a more pungent seasoning, take three teaspoons basil, two teaspoons summer savory, two teaspoons each o celery seed, ground cumin seed, sage and marjoram and one teaspoon o lemon thyme. Mix well, then mash int a powder with a mortar and pestle. T make a spicy seasoning, mix one tea spoon each of cloves, ground peppe and crushed coriander seed, two tea spoons paprika and one tablespoon o rosemary. Mix the ingredients in blender, then store in airtight containe

ORNAMENTAL HERBS TO SAVOR

Ann Lovejoy

Just as a dash of fresh rosemary or lemon thyme can wake up a workaday salad, so an infusion of herbs brings snap to a humdrum border. We don't have to ransack the specialty catalogs to find good looking, aromatic candidates for such a role; some fine and highly attractive plants are probably blushing unseen in the kitchen garden already. Anybody's list of the choicer salvias will certainly include some of the culinary sorts; the fuzzy gray 'English Broadleaf' sage will slip unobtrusively into any color scheme,

Allium tuberosum, *garlic chives, has a grassy sort of growth and appearance topped by flat umbels of sweetly scented white flowers. The blooming plant is rather dramatic.*

Bottom left:
Allium schoenoprasum, *chives, can be interplanted with other plants for a pleasing effect. The fluffy purple blossoms complement the grasslike foliage.*

Anethum graveolens *'Bouquet', dill, has lovely feathery leaves and umbrellalike yellow flowers. Seedlings appear everywhere and can be pulled out where not wanted.*

Photos by Elvin McDonald

making stronger colors all the brighter for its quiet presence. Rippling mats of curly golden marjoram make a lovely, close carpet for edging path or border and the golden leaved form of feverfew (*Chrysanthemum parthenium*) refreshes the eye and brightens shady corners as well as it cures migraines and brings a pungent bite to mild salads.

Choosing among the many flowering alliums in the garden catalogs can while away a wet week, but some of the nicest won't even be in the running. Common chives are a lovely foil for *Diascia rigescens*, a long armed twinflower with lipped flowers of a curious metallic pink. Chives can be planted to good effect near one of the hardiest flowering maples, *Abutilon* x *suntense*. The deep, fluted cups of rich lavender are a perfect match for the fluffy purple chive blossoms, and the grassy foliage of the latter looks nice at the shrub's feet. (This abutilon has proved hardy to 5 degrees.) Garlic chives, *Allium tuberosum*, are similarly grassy, if larger overall, but this one opens flat umbels of sweetly scented white flowers that look especially pretty emerging from the skirts of the low polyanthus rose, 'The Fairy' with its muted pink blossoms. The tall, gray-green blades of common culinary leeks have distinct garden presence, and their massive flower heads in faded mauve and cream are architecturally attractive for months after the flowers have faded. The flower stalks droop with age, tumbling companionably into whatever sits in front of them. They look especially nice growing through roses underplanted with masses of oregano (keep 'em guessing), which also holds its seedheads in good condition for months. Alliums are easily grown from fresh seed, though divisions taken from the vegetable patch will have greater garden impact right away.

The many forms of sweet fennel, *Foeniculum vulgare*, are all more or less decorative. Finocchio, or Florence fennel, with a bulbous base and an odd aniselike flavor, has proved perennial in the Northwest, returning placidly after single digit winter lows. Early spring awakens a froth of bright green that elongates into slender stems. These can reach five feet by midsummer, forming shimmering towers of fine, hairlike foliage. Spangled with rain or dew, this fennel sends scintillations of light through the garden. In fall, it passes away in a burst of copper and gold, lovely and aromatic to the very end. A constantly coppery cousin of common fennel is called variously bronze, black, purple or red fennel. The color is a smoky admixture of them all, the olive bronze tones ascendant in shade (which this plant tolerates very nicely), the warm purple-black tints more pronounced in full sun. This is a stunner, especially when grown in a good sized clump. Paired with the red European wood spurge, *Euphorbia amygdaloides* forma *purpurea*, backed by thickets of *Macleaya cordata*, the plume poppy, and given a front row of something silvery like lamb's ears (*Stachys byzantina*) or steel-woolly balls of *Artemisia canescens*, the coppery fennel adds an unmatchable lightness to the textures and tones of its companions.

Most dramatic of all is the European giant fennel, *Ferula communis*. One does not toss its wiry, netted foliage into the salad bowl but nothing looks fresher than the spumy young shoots of this energetic fennel when they spring eagerly from the cold soil in the last days of winter. It takes several years for a plant to reach maturity, but once established, it will send lusty bloom stalks as much as 15 feet in the air. Each is capped with a wel wrapped yellowish knob that splits to revea a huge, wheeling umbel of coarse white florets. All fennels seed generously and come effortlessly from fresh seed, though the seedlings transplant well only when quite young. If you find lots in the garden, you can transfer tiny clumps to four-inch pots, then grow them on for a bit before setting them in their final spot. Large plants will almos never accept transplanting, but nearly alway scatter quantities of seedlings to replenish old stock. ❧

All Herbs Were Weeds Once: Using Native Herbs in Alaska

David Lendrum

Southeastern Alaskans are blessed with a huge, rich, beautiful land virtually unpopulated by humans which teems with edible fish, shellfish and wildlife. Far from being the frozen land of igloos and dogsleds, it's much more like the Olympic Peninsula of Washington, with huge trees growing close to the ocean's edge along a glacially sculpted filigree of coastline. Hundreds of small streams run off steep mountains into a sea warmed by the immense Japanese current as it sweeps past glaciers and snow packs, so the marine life thrives as in few other places in our nation. Despite the lack of traditional European herbs, a regional cuisine has developed that is unmatched in variety, with flavors far from those found in the usual North American cooking.

Cuisine is influenced by many factors, including:

availability of ingredients: price, freshness, seasonal reliability and access to shopping areas

regional staples: in our case, the products of sea and shore

local agricultural production: totally lacking in Juneau

ethnic derivation of the populace: which in the archipelago of islands and islandlike communities on the mainland leans heavily to Northern European, Japanese and Native Alaskan, with a generous admixture of Filipinos, Hawaiians and other Pacific Islanders brought here during the long maritime trading period.

Long periods without supplies from outside have caused the Alaskans to look closer to home for the flavorings and colorings that enhance foods—taste, texture and visual attractiveness. We do not expect fresh herbs to be available in our corner market, and any larger emporium may be visited only monthly, so if it can't be grown or gathered locally, it is reserved for vacation trips south or done without.

This should not suggest that our cuisine is bland; it is one of the most exciting in the world, combining Scandinavian, Scottish, Irish, Russian, Filipino and Alaskan native inspiration with ingredients southern chefs would die to possess. Beginning with seafood, we dine on four types of salmon, halibut, cod, Ling Cod, Dolly Varden, trout, crab (Dungeness, Tanner or King), mussels, clams, oysters, abalone, shrimp, prawns, cockles and a host of white-fleshed fish known collectively as "bottom fish." Meats are primarily venison, moose, caribou and bear.

Herbs we can grow are greatly restricted, either by the torrential summer rains or by the bone-chilling winter cold that freezes the ocean. The ancient Mediterranean staples of rosemary, thyme, basil and sage are drowned and washed away, so instead we concentrate on parsley, dill, oregano, chervil, sorrel and chives. These northern natives provide flavorings that, if taste were scripted like music, would sing the high notes.

David Lendrum and his wife, Margaret Tharp, own and operate Landscape Alaska, a nursery, landscape and cut flower business in Juneau. Before coming to Alaska, he spent 10 years as the horticulturist for the city of Eugene, Oregon, ran greenhouses at the Carnegie Institute at Stamford and raised fresh market produce in Ecuador. The research for this piece was carried out with the help of a young Tlinkit Indian called the Weed Woman, who introduced the Lendrums to many native Alaskan foods over the years.

Not many traditional herbs will grow in Alaska because of the extremes in weather. Sorrel pictured here is one of the northern natives that will grow and thrive.

Photo by Elvin McDonald

The true regionality of our cuisine is provided by the indigenous plants gathered along the ocean's edge or in the woods and marshes that drain into it. These plants are sources of essential vitamins, minerals and fiber, and are real treasure troves of new flavors. Seafood dishes are often accompanied by sea vegetables. These include several edible seaweeds known locally as ribbon, bull or Indian kelp, which have a vegetable texture, taste lightly of the sea and resemble oriental flavors, smooth and delicate. They float in the surf and can be gathered after a storm and dried for use in soups and chowders or steamed back to a moister state and served alongside. Sea lettuce is pulled from the rocks along the beach and served fresh and raw, fresh and steamed, dried and crumpled like pepper, pickled like chow-chow or piccalilli, or marinated in vinegar with onions and cooked carrots. These ingredients provide the savory broth in which the seafood is cooked—not to be forgotten once tasted.

The same gathering trip can yield 10 or 15 pounds of steamer clams and a five-gallon bucket of bull or Indian kelp (use the long leaves, not the hollow, thickened skin). And if you like the spicy flavor of sorrel, it is abundant at the tide line, so gather a couple of quarts of its arrowhead-shaped leaves to steam for a side dish. Steam the clams in a large pot into which the kelp has been chopped and covered with water. When the clams open, serve in a large bowl with a bed of sorrel. The clam juices running into the sorrel leaves will provide all the seasoning.

Another product of the shore is the Indian rhubarb (*Heracleum lanatum*), a huge plant with eight-foot stems and two-foot palmate leaves topped by a inflorescence like a Fourth of July explosion. It has spicy-flavored stems which must be peeled to avoid blisters, but can then be chopped and sprinkled over venison or bear steaks before broiling. These same stems are often blanched and served with leaves of sorrel, dock and yarrow (*Achillea millefolium*) to create a vegetable medley much desired by locals.

Alaska is home to some 25 kinds of edible berries, many in such abundance that native peoples made rakes to gather them, stripping gallons from the waist-high bushes and drying them for winter use. We use these berries as a condiment—cooked into a jam or dried and sprinkled over a moose roast with bay leaves and onions so they plump up during the cooking and make small, sweet drops in the gravy or dressing.

Alaskan cuisine is thus enriched by our lack of traditional herbs. Flavors are where you find them, and they may reside anywhere if you just look. The native people of every region made use of the plants around them for shelter, weapons, medicine, magic religion and flavoring agents added to all types of foods. We may have carried our ancestral recipes to our new homes, but, just like the scenery, there is something different just over the hill.

Herbs Southern Style

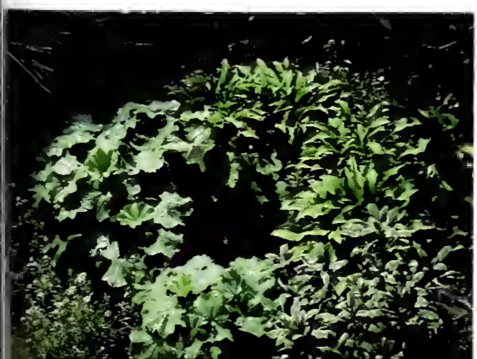
Nancy Goodwin

An herb garden can be a splendid thing. But, must you have an herb garden to enjoy herbs? Must those culinary and medicinal plants be forever restricted to the herb garden? Is their survival dependent on it? Is this the only way you, the gardener, can put them to use? Can they serve any function in the garden other than as a source of culinary and/or medicinal ingredients? The answer to all of these questions is "no." There are many reasons you might want to integrate herbs into the rest of the garden. Some are showy enough in bloom and/or leaf to mingle with lilies and phloxes. Others add fragrance to a garden, which although visually pleasing, might otherwise offer little for the sense of smell.

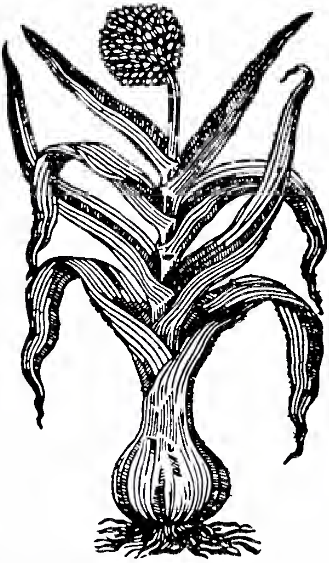
There are many good reasons for gathering all of the herbs into one garden, an herb garden. The convenience of having them all nearby is primary; however, these plants do not occur in herb gardens in the wild, but in complex associations with many other plants. They do not all have the same cultural requirements. Those of Mediterranean origin such as lavender, rosemary, the thymes and oreganos, need full sun and sharp drainage, while others such as sweet cicely, angelica and woodruff need some protection from the hot, southern sun and a more moisture-retentive soil. Herbs with different cultural requirements can more appropriately be placed in different parts of the garden—rosemary in that sunny, hot spot at the edge of the driveway and woodruff as a groundcover under azaleas.

Salvia officinalis, *sage, has narrow, gray-green leaves and is an attractive addition to a mixed border. The blossoms appear on spikes in early summer and are a violet-blue hue. The flowers often hum with bees.*

Alchemilla mollis, *lady's mantle,* Salvia officinalis *'Tricolor', alyssum and a small-leaved hosta make an effective combination. Lady's mantle is grown for its lovely foliage that is further enhanced by droplets of water that often bead the edges.*



Nancy Goodwin is the proprietor of Montrose Nursery in Hillsborough, North Carolina, where she grows many unusual perennials. Her specialties are raising hardy cyclamen from seed and educating gardeners to protect natural populations of endangered plants from over-collection by buying only commercially raised plants.

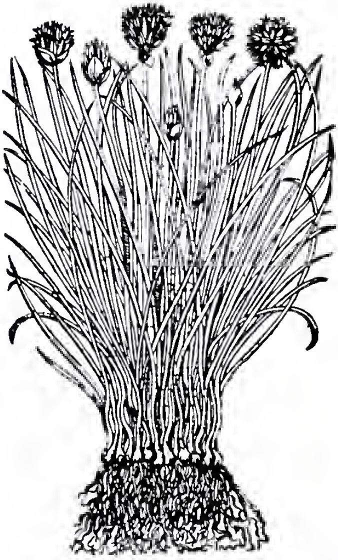


Giant Mountain Garlic

Beyond the fact that it is possible to grow herbs outside the confines of an herb garden, might not some herbs deserve a prominent place for their beauty alone? The answer is "yes" once you recognize those plants which are commonly seen both in and out of the herb garden. Two that come to mind right away—lamb's ears, *Stachys byzantina*, and lady's mantle, *Alchemilla vulgaris*—are likely to be seen in the perennial or mixed border or as ground covers in front of shrubs, especially old garden roses. Lamb's ears are indispensable where silver foliage is desired. Although it doesn't like hot, damp weather, it recovers readily. Herbs such as alliums are ornamental in any garden. The lovely, pink flowers of chives earn them a spot center stage. Cut the whole plant to the ground after it blooms to prevent seeding and to force fresh growth.

Garlic chives, *Allium tuberosum*, are an even better ornamental than the common chive. They flower much later (in late summer) when there is less in bloom and thus are appreciated more. They always stand upright, never becoming sloppy, and their fragrant flower heads of pure white stars are the stage on which countless butterflies and bees perform. Both of the chives make good cut flowers. Two other alliums which provide interesting architecture rather than colorful bloom are giant garlic and Egyptian topping onions.

Giant garlic, *A. scorodoprasum*, is similar to a leek. Each fall, giant garlic arises from its summer dormancy, producing broad, slightly grayish, straplike and handsome leaves, which persist throughout the winter. In May each mature bulb produces a large bud on a stalk that seems to reach ever higher, eventually topping four feet. The bud is sheathed in a tunic of the same gray-green as the foliage. A cluster of these skyward buds suggests many things: hooded monks or a gaggle of geese with upward pointed bills. Despite their height, these plants are best placed near the front of the border where their personalities make a statement. Their narrow outlines will not hide anything behind them. The sheath is eventually shed



Chives
Allium schoenoprasum

and the resulting flower head is a three-inch-diameter sphere of grayish mauve, which is not unlike the giant purple allium, *A. giganteum*, Dutch bulb dealers try to sell you every year. Although the color is duller, the plants are much more permanent. It is worth growing even if it never opened its flowers. The bulbs can be harvested in summer when they go dormant and they provide a mild garlic flavor when cooked.

The Egyptian topping onions, *Allium cepa* var. *aggregatum*, are those peculiar plants that produce a cluster of little onion bulbs where a normal onion would have its flowers. These bulbs all sprout and the cluster becomes a veritable Medusa's head of green sprouts. Perhaps this sounds too bizarre to use as an ornamental, but it might be just what you need to add a touch of humor to the garden. Imagine a clump or two of these onions piercing a broad, low mass of some self-important bedding plant such as marigolds or ageratum.

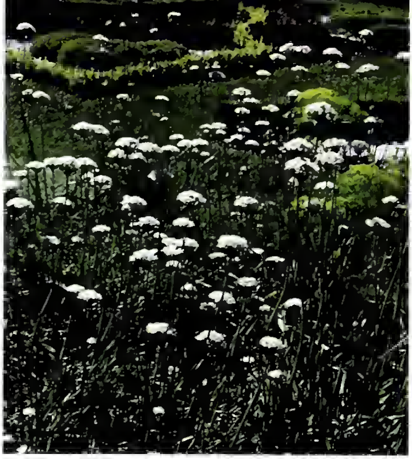
Parsley, *Petroselinum crispum*, is as pretty as many ferns and such a lovely, lively green that it can be used as a foliage plant here and there in sunny parts of the garden. Plant enough so you can share some with the green and black celery worms. They are incredibly handsome creatures and the butterflies they become are like flowers that have taken wing.

Two of parsley's cousins, dill, *Anethum graveolens*, and fennel, *Foeniculum vulgare*, have different uses in the kitchen, but have similar uses as ornamentals. Both create an airy, mistlike appearance with their thread-fine foliage. Dill's bright chartreuse flowers brighten up its neighbors, making hot colors appear clearer but not hotter. It is one of the few colors that looks good with those pinky-orange modern roses like 'Tropicana'. Dill is an annual but where happy will reseed and produce several crops each year. The bronze-leaved form of fennel is an especially beautiful perennial herb which combines well with purples or with hot colors.

Basil, *Ocimum basilicum*, has a similarly colored form. The old variety, 'Opal', was always a weak thing but the new cultivar, 'Purple Ruffles', is as robust as it is handsome. The large, purple, ruffled leaves resemble perilla, *Perilla frutescens*, but it is unlikely that it would ever reseed as heavily as perilla does. (Perilla seedlings are easily removed from any place where they are not wanted.) Both of these purple-leaved plants contrast sharply with silver-leaved ones such as *Artemisia* x 'Powis Castle' and *A.* x 'Valerie Finnis'. We would include basil in a garden just to be able to smell it, either on the air when the weather is warm, or when touched. There are many basils with nearly as many different fragrances; lemon, licorice and cinnamon are a few. (By the way, try using pesto as a substitute for the traditional ingredients in deviled eggs. Mix pesto with the hardboiled egg yolks.)

Thymes bring to the garden an even more varied array of fragrance than do the basils. Many thymes succeed in this climate if they have good drainage, which can be improved with the addition of organic matter and grit or gravel. The prostrate thymes are a must between stepping stones where an occasional trodden shoot will release its fragrance. Their flowers add color in their season, but the silver and gold variegation of some thymes add color all year.

Often it is variegation or some variation from the norm that turns a nondescript herb into a garden feature. 'All Gold' is a cultivar of lemon balm, *Melissa officinalis*, which has solid yellow leaves. It is superior to the older cultivar which was merely spotted with gold and would eventually produce solid green shoots. We have used 'All Gold' among coreopsis and gaillardia in a hot color border. The gold-leaved form of oregano, *Origanum vulgare*, could be used in the same combinations, or in a blue and gold border where it is lovely with the blue foliage of rue, *Ruta graveolens*, an echeveria that is summering out of doors, and the gray foliage of the horned poppy, *Glaucium flavum*. The oreganos seem much less fussy about their soil than do the thymes. We have our original



Photos by Elvin McDonald

Garlic chives, Allium tuberosum, *has delicate white flowers that appear in late summer. The fragrant flowers attract bees and butterflies. The flowers can be cut for arrangements as well.*

golden oreganos after eight years. There are the purple, golden and tricolor forms of sage, *Salvia officinalis*, but they are difficult to grow unless given perfect drainage. It is best to start new ones yearly by taking stem cuttings before the original plant dies.

Ornamental grasses are enjoying great popularity now. Two important herbs which are grasses and gorgeous are lemon grass, *Cymbopogon citratus*, and vetiver, *Vetiveria zizanioides*. Both are tender and need to be overwintered in a frost-free cold frame, greenhouse or windowsill. Both offer the delightful, airy texture typical of other ornamental grasses. Vetiver is so tall and narrow, at least when young, that it can be used almost as an exclamation point among lower plants, or a fountain perhaps, as grasses are so often described. Lemon grass is shorter and is one of the few grasses with grayish foliage. It is a delightful addition to a planting of silver- and gray-leaved plants because its texture is different from most of the other plants.

If all of the preceding plants find a role outside the herb garden because they are ornamental, we want to encourage the addition to the ornamental garden those plants which might be considered plain, dull or even ugly but which bless us with delightful fragrances. Anise-hyssop, *Agastache foeniculum*, isn't ugly, although its appearance is somewhat dull, but we would never want to be without it. The fragrance of a crushed leaf is as bright and refreshing as a tall, cool glass of sarsaparilla. We buried our noses in this plant while gazing upon the scentless alstroemerias or Siberian irises: any garden becomes a fuller experience as more and more of the senses are involved. Even weeding is made more pleasant when working among fragrant plants.

Plants that should definitely escape the herb garden are those that never really belonged there in the first place. Often they have no herbal uses themselves but are relatives of herbs. To be used only in the herb garden is perhaps a little like having one's occupation restricted to that of one's great-uncle once-removed. Three genera that come to mind are *Salvia, Allium* and *Origanum*. The alliums include garlic and onions. *Salvia officinalis* is the culinary sage and Origanum is oregano and marjoram. All three of these genera include many non-herbal but showy members that should be better known by gardeners. Some wonderful salvias such as Mexican bush sage, *Salvia leucantha*, the hybrid *S.* x 'Indigo Spires' and *S. greggii* have just begun to receive the attention they deserve. *Origanum pulchellum* is one of the many ornamental oreganos. It has inch-long clusters of pale green bracts under which pink flowers peek. It is best displayed atop a wall so that these flowers can cascade over it. There are many other examples of excellent ornamentals waiting to be liberated from the herb garden. Herb gardens and nurseries are often treasure troves for the gardener searching for new ornamentals.

Ultimately what one does in his or her own garden has to meet only one criterion. It has to please the gardener. Whether one gather all of one's herbs in a garden or allows them to mingle throughout the rest of the garden is a personal decision. But we have concluded that our herbs do not need their own garden for their successful cultivation and that they can add so much to the genera garden with their beautiful flowers, leaves forms and fragrances. ⁂

Mixed Border, Edible Border

Cynthia Gillis

The day of the separate kitchen garden is over for most of us. No longer is there a cutting garden out of sight behind a screen or hedge, tended by gardeners and used by cooks, leaving us to idle in beautifully designed, purely ornamental gardens.

A mini-garden of herbs contains bay, 'Dark Opal' basil, chives, thyme, parsley and golden sage. Plants can be kept to size by frequent snipping.

Ocimum basilicum *'Spicy Globe' grows well in pots or in the garden border. The advantage to pot culture is that when the basil looks ragged from cutting, it can be moved out of sight.*

Today, most of us are our own cooks, our own gardeners, and in our small backyards we don't have space to hide the herbs we're going to harvest. The plants we grow for the kitchen also have to serve attractively in the garden.

Fortunately, many culinary herbs make utterly charming neighbors. They're attractive as plants, offering beautiful leaves or flowers and maintaining an attractive habit without a lot of propping up. They form

Mint, blooming in the background, adds a fresh fragrance to the garden. It can be kept in bounds by using an underground barrier or by planting it in a pot and sinking the pot in the ground. A scented geranium adds an interesting texture to the foreground.

Photos by Elvin McDonald

Cynthia Gillis gardens at her home in Brooklyn, New York. She is a garden designer whose writing has appeared in Horticulture *magazine.*

pleasing combinations with other plants in the garden and accept the same cultural conditions as their companion plants. And they can be planted and combined so that when we snip away at them for the kitchen, the garden doesn't look any the worse for wear.

A plant that fully earns its keep this way is the nasturtium (*Tropaeolum majus*). A trailing or climbing annual, its large, round, blue-green leaves make a fast-growing ground cover and background filler-plant, showing off any other plants seen against it. Every year, I interplant some nasturtium seeds with a group of *Allium christophii* bulbs. The pale, silvery-mauve balls of allium flowers look better against the round nasturtium leaves than against their own leaves, and later, when the allium goes dormant, the nasturtium completely fills the space.

Nasturtium also combines well with lavender and lady's mantle (*Alchemilla mollis*). Together, the soft, gray-green needlelike leaves and shrubby habit of the lavender, the neatly pleated fan of leaves and curly-headed yellow-green flowers of the lady's mantle, and the profusion of the nasturtium make an enthralling trio of texture, color and growth habit.

As a kitchen plant, nasturtium is almost a one-plant band. The leaves are a peppery addition to salads (tasting much like watercress, whose botanical name, interestingly, is *Nasturtium officinale*). The buds and seeds can be pickled in vinegar and used as a substitute for capers. The sweetly fragrant flowers are often used as an edible garnish—lovely when floating on a cold summer soup.

The fresh fragrance of mint also makes it a welcome garden plant despite its inclination to take over the garden. The best way to control mint is to use an underground barrier or to plant mint in a pot and sink the pot into the ground. I once failed to heed the warnings about mint, and it spread throughout the flower bed, under the nearby stone patio, and eventually filled in all the spaces between the stones. Every time someone stepped onto my patio, the scent of mint was released.

For this reason I now deliberately grow mint this way, between paving stones, used the same way as thyme. It doesn't mind being stepped on, and when it is, the whole garden is filled with its fragrance. I cut it down to the ground when it appears where I don't want it.

One of my favorite late-summer dishes is an appetizer consisting of fresh figs halved lenghwise, a whole mint leaf placed on the cut side, and both wrapped in a strip of prosciutto ham with the green tip of the fresh mint leaf visible against the rosy ham.

I prefer to grow green basil (*Ocimum basilicum*) in containers. I don't find it particularly attractive in the garden until it flowers. And once it does flower its leaves become quite bitter and are no longer suitable for making pesto sauce, an uncooked basil-based sauce that's a staple of our summer menus.

My favorite recipe: Combine in a blender 2 packed cups of basil leaves, ½ cup olive oil, 2 tablespoons of pine nuts, 2 cloves of garlic. Blend these ingredients until they're smooth, then beat in by hand ½ cup fresh-grated parmesan and 2 tablespoons softened butter. Since a single recipe for this pesto sauce can use almost a whole basil plant (or large amounts cut from several plants), it can have a rather noticeable effect on the appearance of the garden. Containers with decimated basil plants can be moved out of sight to rejuvenate. I generally discard picked-over plants and replant with some other herb or flowering annual.

In the garden I find that purple basil (*Ocimum basilicum* 'Dark Opal') is a much more interesting ornamental plant. Purple basil makes an unexpected edging in front of *Rosa rubrifolia*, complementing its red-tinged, blue-green leaves and ruddy canes and also providing color after the roses' all-too-brief flowering period. *Sedum* 'Vera Jameson' also combines nicely with the basil and roses. Its blue-green, red-veined leaves and stems make it similar in overall color effect to the basil and the roses, and its thick, almost perfectly round succulent leaves provide textural contrast with the toothed, silky basil leaves. In the kitchen a few leaves of purple basil can be used as a colorful addition to a green salad, to season thick slices of ripe tomatoes or as an aromatic addition to stew.

One of the few herbs that grow in the shade is sweet woodruff (strictly *Asperula odorata* or *Galium odoratum*), the flavoring ingredient in May wine. To make this springtime punch, combine 12 sprigs of sweet woodruff, 1 cup of powdered sugar, 1 bottle of Moselle or other moderately dry German white wine. After about ½ hour, remove the sweet woodruff leaves, pour the mixture over a block of ice in a punch bowl, and add 1 quart of sparkling water. You can use fresh sprigs of sweet woodruff to decorate the punch.

Sweet woodruff makes a lovely ground cover in a shady, woodland area, and in the spring its tiny, white star-shaped flowers sparkle against the glossy whorls of its leaves. I've grown it in combination with drifts of *Lamium* 'White Nancy', whose white-variegated leaves and white flowers contrast elegantly with the sweet woodruff.

The first time I saw sweet cicely (*Myrrhis odorata*) I didn't know that it was an herb. I only knew I wanted it. It was planted in a mass, forming a graceful, feathery, three-foot-high hedge. A slight breeze was enough to release the sweet, anise fragrance that arises from every part of the plant. Adding some chopped cicely leaves to cooked, buttered carrots or sweet potatoes gives a light and interesting licorice aroma that complements the flavor of these sweet root vegetables.

Sweet cicely is another herb that will grow and flower in shade. Its clusters of white flowers (reminiscent of Queen Anne's Lace) and delicate foliage make it an attractive sight when planted in front of the deep green, coarse leaves of a rhododendron or leatherleaf viburnum (*Viburnum rhytidophyllum*).

Here are some other combinations of culinary herbs with ornamental plants that are visually pleasing:

Chives (*Allium schoenoprasum*) planted with a blue-flowering cranesbill geranium. The geranium gracefully flops over, so when I snip some chives for soup or a salad the gernanium covers the spot. And since the chives flower before the geranium, that space in the garden is in flower for a very long time each summer.

Sage (*Salvia officinalis*) and rosemary (*Rosmarinus officinalis*) combine with lily-of-the-Nile (*Agapanthus africanus* 'Headbourne Hybrids') for a mostly edible summer flower border in blue and silver. The dark green, straplike leaves of lily-of-the Nile, and its tall, deep blue flowers make a dramatic contrast with the pale blue flower spikes and silver leaves of the sage and the soft-needled rosemary. And because the three plants grow into one another, I can use all the sage and rosemary I like, without damaging the visual effect.

This combination is beautiful year-round. In winter the soft, silver-green leaves of the sage take on a ruddy tone, creating a wonderful garden picture next to the shrubby evergreen rosemary.

If rosemary weren't hardy in my garden, I'd use a yew (*Taxus cuspidata*) in its place for a similar, fine-needled effect, keeping it pruned to about three feet. (Yew is an ornamental substitute, not a culinary one. It's extremely poisonous and has figured in many a murder mystery.) Similarly, *Allium giganteum* could substitute for the agapanthus.

My garden in Brooklyn, New York is in USDA Zone 7, where the average minimum temperature is about 0 to 10 degrees F. However the shelter provided by surrounding brownstone houses, and the use of deep winter mulch has helped me keep these tender plants thriving in the garden for four years.

The goal in a small space is to create a garden picture. Thus all the herbs that I grow, I would grow even if they had no culinary purpose. But fortunately, one doesn't have to choose, since so many beautiful plants are also so good to eat. ❦

Cooking with Less Common Herbs

Sal Gilbertie

Cress evokes childhood memories of picking the fresh green growth from the banks of a nearby creek and nibbling on the cold, peppery leaves. Whether it's grown wild on the banks of a stream or in the herb garden, you'll want plenty of cress for salads and superb cress soup. Of the several varieties of cress, watercress is the best known to the cook and most widely used. Garden cress is similar in flavor to watercress but slightly sharper and its leaves are smaller and a paler green.

Although not an aromatic herb, cress adds a peppery flavor (often described as a combination of the flavors of parsley, spinach and mustard greens) to everything from green or vegetable salads to pasta, fish, chicken, potatoes, soups and grains. Add minced cress leaves to hollandaise, béarnaise and beurre blanc. Add finely minced cress leaves to crepe batter, compound butters and crème fraîche (for topping grilled fish or chicken paillards). Include some minced cress in soufflés or fish mousse.

Chinese cooks use watercress for its pungent flavor in broth soups at the end of a rich meal and in stir-fry recipes with meat or chicken.

Cress is the traditional English sandwich stuffer or topping on finger sandwiches for the tea table. Mix fresh cress with radish, alfalfa and bean sprouts for a crunchy filling for sandwiches or crepes—or toss with a mustard vinaigrette for a salad rich in texture and flavor.

For an elegant first course, arrange rolled slices of lightly smoked salmon on a bed of watercress. Add slices of hard-cooked egg and offer a dill vinaigrette. Sprinkle on capers; add a few nasturtium blossoms for a beautiful presentation.

If you grow arugula (roquette) in your garden, combine equal amounts of finely chopped watercress and arugula with grated onion, a dash of Tabasco, a squeeze of lemon and just enough sour cream to bind. Offer the spread in a pretty bowl, surrounded with toast points.

Foeniculum vulgare dulce, *Florence fennel, is an essential kitchen herb. The bulb and tender stems have been a familiar vegetable for quite some time, but an increasing number of cooks are using the feathery foliage in their recipes.*

Sal Gilbertie runs Gilbertie's Herb Farm, a family business which has become one of the foremost herb nurseries in the country. Kitchen Herbs: The Art and Enjoyment of Growing Herbs and Cooking with Them *is his first book.*

Watercress, which grows wild on stream banks, can be grown in a pot partially submerged in water. This herb is a superb addition to salads and soups. Its peppery flavor adds to almost any dish.

Add some sprightly sprigs of cress to gazpacho. Tuck the tender stems into pita bread filled with rare roast beef. Top with a dollop of sour cream and the best caviar that you can afford for a peasant sandwich worthy of a special occasion.

For a refreshing and healthful drink, throw some watercress in a blender with cold tomato juice, some fresh basil leaves and a dash of Tabasco. Chopped cress is excellent mixed with mayonnaise as a salad dressing. Add the leaves to potato salad, chicken salad or seafood salad, just before serving.

Cress is best eaten raw or cooked briefly. It will not dry or freeze. To keep cress fresh once picked, store it in the refrigerator with the stems in water and the leaves covered by a plastic bag. Plan to use the cress within a day or two.

Excerpted from *Kitchen Herbs: The Art and Enjoyment of Growing Herbs and Cooking with Them*, Bantam Books, NY 1988

Lady Apple and Blue Cheese Salad with Pomegranate Dressing

Serves 4

Rich with autumn colors, this spectacular salad has a combination of flavors that makes it perfect for a roast chicken or duck dinner. The tart, stylish dressing is especially good with fresh watercress.

*12 lady apples**
Fresh lemon juice
4 cups watercress leaves and tender stems
¼ pound blue cheese, crumbled
⅓ cup olive oil
3 tablespoons raspberry vinegar
1 shallot, minced
*¼ cup pomegranate seeds from 1 pomegranate***
Salt and freshly ground black pepper to taste

Cut apples in half lengthwise; stem and core. Rub cut surfaces with lemon juice. Wash and thoroughly dry watercress. Tear watercress into bite-size pieces and divide equally among 4 chilled salad plates or shallow bowls.

Arrange 6 apple halves on each plate; sprinkle with blue cheese. Whisk together oil, vinegar and shallot. Stir in pomegranate seeds. Sprinkle salads with salt and pepper to taste. Spoon on dressing.

Lady apples are very small white apples with a red blush that are available from mid-October through December. If not available, substitute wedges of red or yellow Delicious apples or seckel pears.

***To remove the seeds, cut the pomegranate in quarters and remove the flesh from the shell with a spoon. Remove and discard the connecting pulp.*

Cooking with Fennel

For Italian and French cooks, fennel is an essential kitchen herb. Its delicate anise flavor is valued for fish, sausages, salads, breads and pasta. For years, the bulb and tender young stems of Florence fennel (also called finocchio) have been a familiar vegetable in American kitchens but increasingly the herb fennel is becoming popular—its leaves and seeds are also used with poultry, pork, soups and cooked vegetables such as cabbage, peas, beans, potatoes and cauliflower. All parts of this graceful Mediterranean plant can be used in cooking.

The feathery green leaves are wonderful with fish. Stuff whole fish with the leaves and stalks before roasting or grilling. Add the leaves to a poaching liquid or to a basting sauce. For a quick fish butter, combine ¼ cup (½ stick) unsalted butter, 2 teaspoons lemon juice, salt and freshly ground black pepper to taste, 2 tablespoons finely chopped fennel leaves and a dash of Pernod.

Stir the chopped leaves into hot tomato soup to heighten its flavor, add them to meat loaves and polenta. Sprinkle them over salads or into marinades. Chopped fresh fennel does wonders for white bean salad.

Add the crushed fennel seeds to crumb toppings for casseroles, press them into pork chops before grilling or stir them into bread dough, steamed cabbage or a spicy sausage sauce for pasta. Use fennel seed in combination with the chopped fresh leaves as an aromatic stuffing poked into slits cut in a pork roast.

Treat the hollow stalks as you would celery in cooking. Eat them raw or simmer the stalks in water or chicken stock as a vegetable to be served with butter. They can also be sautéed in garlic and olive oil. Add them to soups or stews (at the last as they cook quickly). Children love the licoricelike flavor of fennel; let them use a fresh fennel stalk as a straw for sipping orange juice. In the South of France, the dried fennel stalks are the bed on which grilled sea bass is flamed. Try adding a few sprigs of fresh rosemary to the fennel for a fantastic flavor and aroma.

The root can be thinly sliced and simmered in chicken stock until tender for a simple fennel soup, adding salt and freshly ground black pepper to taste. The clusters of lovely yellow flowers in late summer and early fall are beautiful as a garnish.

Make fennel vinegar and then use the vinegar for *buerre blanc* fennel sauce. The leaves can be dried but they will lose some of their pungency. Fresh fennel leaves can be frozen for up to two months, packed in small bunches in plastic bags. Use them as you would fresh.

Flamed Tuna with Fennel and Tangerine Sauce

Serves 4

This is a variation of the famous French method of flaming fish with fennel using fresh tuna, which is deliciously meaty when cooked in this manner. Serve wild rice and a julienne of zucchini and carrots with the fish.

4 thick tuna steaks (about 6 ounces each)
Salt and freshly ground black pepper to taste
¼ cup olive oil
2 tbls. chopped fresh fennel leaves
2 tbls. chopped flat-leaf parsley
Dried fennel stalks
Cognac for flaming, warmed
Fresh fennel sprigs, tarragon sprigs and edible flowers for garnish

Grated zest of 2 tangerines
Tangerine sauce (recipe follows)

Sprinkle tuna with salt and pepper, to taste. In a small bowl, combine olive oil, fennel and parsley. Grill tuna over hot coals about 3 to 4 minutes per side, until brown on the outside but slightly pink inside, basting with fennel oil.

Arrange fish over dried fennel stalks on a flameproof platter. Pour over warm Cognac and flame. Spoon sauce onto individual serving plates. Arrange tuna over sauce and garnish with herbs and edible flowers. Sprinkle with tangerine zest. Serve with remaining Tangerine sauce.

Tangerine sauce:

½ cup fresh tangerine juice
2 tsp. chopped fresh tarragon
¼ cup unsalted butter, cut into 4 pieces

Bring tangerine juice and tarragon to a boil in a small saucepan. Whisk in ¼ cup butter, piece by piece, until sauce thickens.

Cooking with Sorrel

For those who love sorrel, it's the star of the kitchen herb garden in the spring, evoking childhood memories of nibbling on sour grass. Sorrel is much like garlic, either loved with a passion or disdained with an equal passion. A staple in the French kitchen, sorrel tastes like sharp, sprightly spinach with a sour, lemony tang.

Sorrel can be overwhelming until you've acquired a taste for its sharp flavor; add it slowly, tasting as you go. A bit of chopped sorrel will hide the fact that you've omitted salt.

Keep a chiffonade of fresh sorrel, cooked in a skillet with a little unsalted butter until it literally melts, in the refrigerator to blend into soups, sauces, dips and dressings; for filling an omelet; and for topping a baked potato or poached fish. Serve poached eggs on a bed of sorrel chiffonade that has been wilted with finely minced shallots for a summer brunch.

When whole large sorrel leaves are used as a wrapping for cooking, they impart a tenderizing effect as well as lending their subtle tartness for flavoring. Wrap jumbo sea scallops in large sorrel leaves. Steam-cook for 3 to 4 minutes and serve with a lime butter sauce. Use the tender leaves in place of lettuce in hot or cold sandwiches and hamburgers. Offer finely shredded sorrel for tacos and tostadas.

Tear the young leaves for salads of greens, cabbage or potatoes, discarding the stems and center ribs of larger leaves. When using sorrel for a green or cabbage salad, wrap the washed leaves in paper towels and store in refrigerator to crisp before adding. Cut back somewhat on the vinegar or lemon juice in the dressing. Shred fresh sorrel into radicchio leaves. Top with sliced fresh mushrooms and chopped fresh tomato that have been warmed in a little olive oil. Sprinkle lightly with red wine vinegar. Add salt and freshly ground black pepper to taste.

Stir chopped fresh sorrel into your favorite gazpacho before chilling. Add shredded sorrel to a fish soup. Stir chopped sorrel into a beurre blanc to spoon over broiled salmon fillets. Additional fresh sorrel as a garnish will reinforce the clean flavor.

Try spinach and sorrel together for a subtle, flavorful combination. Add sorrel to creamed spinach, a spinach soufflé or spinach soup or just wilt sorrel and spinach together and toss with unsalted butter and a few grains of grated nutmeg.

Sorrel is widely used in Russia; it's virtually unused in England, Italy and other Mediterranean countries. The French use sorrel primarily in two ways: in soups and sauces. Their sorrel soup is a world classic, loved for its delicate sour taste. The soup is served hot or cold, enriched with a spoonful of crème fraiche or sour cream and chopped fresh sorrel.

To keep the bright green color of sorrel, quick cooking is essential. Heat will cause the color to fade quickly, so add sorrel at the last minute.

Sorrel does not dry well. If your herb garden is prolific, you can freeze sorrel by puréeing the leaves; pack into freezer containers for a taste of summer during the dead of winter. Stir the purée into soups or mayonnaise to use as a sauce for poached fish or as a spread for sandwiches.

Scallop Salad with Sorrel Dressing

Serves 4

Ideal for salads, the tender leaves of raw sorrel impart their natural tartness to poached sea scallops in this colorful salad. The tangy, sour leaves are also in the dressing. Serve with crusty rolls and glasses of white wine for a casual summer luncheon on the patio.

1 pound sea scallops
½ cup dry white wine
½ cup water
2 shallots, finely minced
3 cups loosely packed small sorrel leaves
2 tbls. white wine vinegar
2 tsp. dry mustard
1 tsp. sugar
½ cup olive oil
2 ripe avocados
2 large sweet red peppers, peeled and sliced in thin julienne strips
2 tbls. chopped fresh chervil

Rinse scallops. In a large heavy skillet, combine wine, water and shallots; bring to a boil. Add scallops; cover and poach for 5 minutes, or until scallops are just opaque in center when cut. Drain and chill until cold.

Rinse sorrel; trim off and discard any coarse stems. Chop enough leaves to make 2 tablespoons. Set aside. Wrap remaining sorrel leaves in paper towels, enclose in a plastic bag and chill in the refrigerator to crisp.

In a food processor or blender, combine reserved 2 tablespoons chopped sorrel leaves, vinegar, dry mustard and sugar. Process until mixture is a purée. With motor running, slowly add oil through the feed tube and process until well blended.

To assemble salads, place the sorrel on 4 chilled serving plates. Peel, pit and slice avocados; fan out on the greens. Arrange the scallops and red peppers on plates. Drizzle each salad with prepared sorrel dressing and garnish with chopped chervil.

Cooking with Lovage

Lovage is an old-fashioned herb with a distinctive flavor—like pungent celery with a hint of lemon and anise. If you've never eaten lovage, use it cautiously at first. Cut the leaves or tender stalks for soups and use a few chopped sprigs in salads. A little lovage goes a long way.

All parts of this magnificent Mediterranean herb are used in cooking. Use the leaves as you would any other aromatic herb in salads, stuffings, vegetable soups and omelets. Cut and blanch the young hollow stalks as a vegetable, chop them into soups and sauces or candy them as you would angelica for garnishing cakes. Use tougher mature stalks in chicken or beef stock.

Fill the cavity of a nonoily fish such as red snapper or trout with lovage stems and leaves. Baste with olive oil infused with chopped lovage leaves while grilling or baking. Flame with a splash of Pernod.

When cooked, fresh lovage is not as pungent in flavor. Lovage seeds dry well; sprinkle them over meat or into bread dough. Lovage seeds also make a flavorful herb butter. Grate the lovage roots to make tea or chop them and preserve in honey for basting ham and pork.

A preservation method that works well with lovage is the salt method; sprinkle ½ teaspoon salt per 1 cup of loosely packed chopped lovage. Alternate ½-inch-thick layers of chopped lovage with salt sprinklings until the container is full. Refrigerate. Use this lovage salt instead of table salt for cooking.

Lovage Frittata

Serves 4

Lovage and frittatas—huge thick omelets bak ed in the oven—are both native to the Mediterranean. Perfect for brunch, lunch or supper, frittatas are wonderfully flexible and can be quickly made with whatever vegetables and herbs you have on hand. For a light Sunday lunch, serve this frittata with hot, crusty herb bread and an arugula (roquette) and garden lettuce salad. Offer iced cherries or champagne grapes and your best homemade cookies for dessert.

3 tbls. olive oil
2 medium baking potatoes, peeled and thinly sliced
1 medium onion, peeled and thinly sliced
½ cup loosely packed lovage leaves
2 sweet red peppers, minced
8 eggs, lightly beaten
Salt and freshly ground black pepper to taste
2 sprigs of fresh thyme

Preheat oven to 400°.

Pour the olive oil into an 8-inch baking dish.

Arrange potato and onion sliced in the baking dish; bake for 20 minutes, or until potatoes are just tender. Sprinkle lovage and red peppers over the other vegetables. Pour eggs over vegetables and sprinkle with salt and pepper to taste. Arrange thyme on top.

Bake until eggs are set, the sides are puffed and the top is golden brown, about 20 minutes. The frittata should be firm but not dry. Serve hot or at room temperature.

Strasbourg Hens with Lovage Stuffing

Serves 2

Fresh lovage adds the perfect flavor accent to the stuffing for these game hens served with a beer sauce. Finish this country meal with

Many soups benefit from the addition of herbs. Pictured here is a cold, creamy avocado soup garnished with citantro.

two fresh vegetable purées, beet and carrot. For dessert, make a rhubarb crisp served with spoonfuls of crème fraîche.

1 small onion, minced
1 carrot, finely diced
⅓ cup finely chopped fresh lovage (use the tender young shoots and leaves)
2 tbls. salted butter
1 bay leaf
1 sprig of fresh thyme
½ cup wild rice
2½ cups chicken stock (preferably homemade)
Salt and freshly ground black pepper to taste
2 ¾-pound Cornish hens
2 slices bacon
1½ cups light beer, at room temperature
½ tsp. sugar
1 carrot, peeled and cut in fine julienne strips
1 leek (white part only), washed and cut in fine julienne strips
Salt and freshly ground black pepper to taste

To make stuffing, sauté onion, carrot and lovage in butter for 10 minutes. Add bay leaf, thyme and wild rice. Add 1 cup chicken stock. Bring to a boil; cover and reduce heat to low. Cook for about 30 minutes, stirring occasionally with a fork to prevent sticking. Add salt and pepper to taste. When rice is tender, remove thyme sprig, drain off any excess liquid and set stuffing aside to cool slightly.

Preheat oven to 350°.

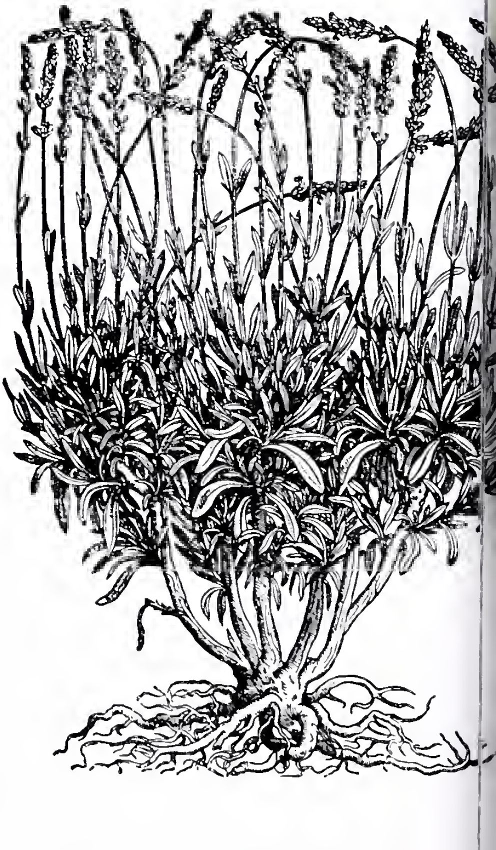
While stuffing is cooling, debone hens by turning the hen breast side down on a cutting board. With a sharp knife, cut down both sides of the backbone. Remove meat from the rib cage, cutting as close to the bone as possible. Cut away the whole carcass from the meat. Remove the thigh bones from each leg and turn the hen skin side up. (If you're on good terms with your butcher, ask him to debone the hens for you.)

Carefully loosen the skin from the meat. Insert ½ cup of prepared stuffing under the skin of each hen. Turn hen over and fasten skin closed with a small skewer. Tuck wing tips under breast and tie the drumsticks together with kitchen string. Place hens breast side up in a shallow baking dish.

Cut bacon slices in half and cover each hen with two strips. Roast for about 45 minutes, until golden brown. Remove hens from pan, remove skewers and keep warm. Drain off the excess grease from the roasting pan; add ½ cup beer to deglaze. Strain into a saucepan; add remaining 1½ cups chicken stock and set aside.

In a large heavy skillet, combine remaining 1 cup beer and sugar. Bring to a boil over medium-high heat. Add the carrot and leek. Cook about 3 minutes or until just tender. Lift out the cooked vegetables and keep warm. Add the vegetable juices to the reserved pan juices and reduce over high heat to thicken. Add salt and pepper to taste.

Remove bacon from the roasted hens. Place on individual heated serving plates and garnish with julienne vegetables. Nap hens and vegetables with the reduced sauce.



Lavender Lavandula angustifolia

Hardy Herbs for Northern Gardens

Roy Barrette

In England the word herb is pronounced herb, in America usually urb. *The American Heritage Dictionary* gives urb as the preferred pronunciation. *The Oxford English Dictionary* prefers herb but gives erbe as Middle English and says the H was added in the 19th century. The Americans were, apparently, well satisfied with urb or erbe and stuck with it. In any event both dictionaries agree that a herb, or an erbe, take your choice, is a plant that has (1) a fleshy stem that dies to the ground in the winter or (2) is used especially for medicine, scent or flavoring. Most people in both countries think of herbs as falling into the latter category.

While almost all gardens have some plants falling into classification (2) there are enthusiasts, such as members of The American Herb Society, who have whole gardens or parts of them especially set aside for plants that are fragrant, flavorful or medicinal. These are what people think of as herb gardens. I do not have an herb garden as such, but I cultivate about two acres of shrubs and perennials, and a few annuals, which include plants falling into the popular understanding of what constitutes an herb. I think most gardeners do.

I live on the coast of Maine and am fortunate in being within 800 feet of the lower reaches of a large bay so that the ameliorating effects of the salt water (if it is not frozen) places my garden in Zone 5/6; a few miles inland it is 10 degrees colder in the winter and much hotter during the summer. I mention this as an important factor in growing all plants, as well as microclimates—north or south of a wall, a boulder or a building.

My favorite herb is rosemary—Shakespeare's plant for remembrance. I have four bushes which are planted every spring at the feet of a couple of espaliered pears. Every summer some delighted visitor says "I didn't know you could grow rosemary in Maine." You can't, outdoors, but I dig mine every fall after frost, cutting back roots and top fiercely and stuffing them into 12-inch pots that are taken into the cold end (45 degree night temperature) of my greenhouse where they rest all winter. In the spring they are planted out and by fall are over three-feet tall. They propagate easily from four-inch summer cuttings. I have enjoyed my old plants for 20 years. They are tolerant of neglect. *The Royal Horticultural Society Dictionary of Gardening* says that Marian Cran, whose name is familiar to most gardeners, recommends a mixture of rosemary, mint, tansy and thyme plus some ground cloves as a moth destroyer. I've never tried it so can't confirm that it repels moths, but I'll bet it smells good.

Another of my friends among the herbs is lavender. It is hardier than rosemary but in this climate is a sometime thing. I have two large plants outside the south end of my greenhouse that have been happy for 15 years. They were given to me by a woman who lives high up in the Berkshire hills; she grew them from

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Roy Barrette's column, "The Retir'd Gardener," ran in The Ellsworth American *for 23 years. In July 1989, when Barrette celebrated his 92nd birthday, the retired gardener became the tired gardener, and the column ceased. His writings have been published in* Yankee *magazine and several newspapers, and his garden at Amen Farm in Brooklin, Maine, was profiled in* Horticulture *magazine in 1987.*

Tarragon has been gathered in preparation for making vinegar. Herbal vinegars are easy to make and much less expensive than the ones in gourmet shops.

seed, but 16 of their clones grown from cuttings died last winter. They were five years old, grown as a hedge and had a western exposure. I now have 50 year-old plants under cloche and fir mulch in my kitchen garden. They are said to be 'Munstead Dwarf'. I await the spring with interest and a little apprehension.

In my garden chives provide an edging to a flower bed. The row is about 30 feet long. We cut it early in the year before blossoming and put what we need in the freezer. As thrift (*Armeria*) of old fashioned gardens is not quite hardy with us, we use chives (*Allium schoenoprasum*) in its place. It is rather more buxom but serves well enough as a substitute. I also grow what are known as garlic chives, which have flat leaves and are much more delicate in appearance, as clumps in my flower border. The leaves have a faint smell of garlic and are wonderful in a green salad but their flowers are delightfully fragrant. I pot up a few clumps in the fall and leave them out until the tops die down and then bring them into the greenhouse for early spring forcing.

Photo by Elvin McDonald

Tarragon ready for the addition of vinegar. The French variety is much more flavorful than the Russian.

Tarragon (*Artemisia dracunculus*) grows well in a southern exposure. In midsummer we use the leaves in fish recipes and also to make tarragon vinegar. You can make enough tarragon vinegar to float a battleship from a couple of bushes and it won't cost you as much as a fancy bottle that only holds about a half pint from the supermarket. When you buy your plants be sure you get the French variety with smooth, dark green leaves. It is much more flavorful than Russian.

I don't know if sorrel (*Rumex scutatus*) is considered an herb that falls in category (2), but we think it flavorful and grow it to make sorrel soup. It is an easy perennial, and one can pick from a few plants all summer. *JOY OF COOKING* has a tasty recipe for cream of sorrel soup. Sorrel, whose leaves resemble those of dock, belongs to the same family and is about as hard to kill once it gets hold, so plant it where you expect to leave it. Generally, herbs are tough, tenacious plants; give them reasonably good treatment and they will last for years.❦

Here is an array of vinegars prepared from many different herbs. Not only are these vinegars flavorful, but they are attractive as well, especially with the light shining through them. They make excellent gifts.

New Ways with Herbs

Recipes From Le Gourmand

At Le Gourmand we get to enjoy ourselves improvising with flavors and textures of the wonderful variety of ingredients available to us in the Northwest. Over the years we have developed a network of suppliers—small orange farmers, fishermen, mushroom gatherers—who provide us with the materials with which we work.

Fresh herbs have always played an important part in our cooking. We use them in three basic ways: first, simply as distinct flavorings in themselves such as basil with tomatoes, garlic and olive oil over fresh goat cheese, or in a sauce for the albacore tuna which runs off the Washington and Oregon coasts in August—just in time for the tomatoes and basil. Or maybe French tarragon for a simple roast chicken or in a rich butter sauce for our crayfish. Or sorrel for our rich, tangy sorrel soup.

In early spring menu features a lamb stew containing many herbs and vegetables accompanied by a salad of greens including arugula with a hot bacon dressing. A crusty bread completes the menu.

Photo by Inger Skaarup

Photo by Elvin McDonald

A bouquet of different basils complements the tray of cheeses and other hors d'oeuvres about to be served.

Secondly, we use fresh herbs for their ability in certain combinations to enhance the flavor of something—perhaps you won't taste the herb itself, but whatever you are eating will taste better than anything you have ever eaten. My favorite example is the magic that fresh lovage does to mussels.

Lastly, we combine herbs and other ingredients, such as fruits, with rich stocks to produce complex sauces. In this situation the flavors combine to create a new flavor with its own individual character. Apple and tarragon do this, as do apple and sage. Peaches and basil, and gooseberries with dill, are also favorite combinations and are featured in the recipes that follow.

There are no "right" or "wrong" combinations or uses for herbs. As with so many things, what one finds delicious is literally a question of taste. The recipes that follow are products of much experimentation. We encourage others to have fun. Experiment, improvise. Think of the menu—what you'd like to taste with what. The garden is the limit.

Mussels Steamed with White Wine and Fresh Lovage

2 lbs. fresh mussels (Washington State preferred)
1 cup dry white wine
½ cup fresh lovage leaves
¼ lb. melted, unsalted butter

Beard mussels. In a non-aluminum pan add wine, lovage and mussels. Cover and steam until mussels are open. Transfer to a large serving platter or individual bowls. Generously ladle steaming liquid and melted butter over the cooked mussels and serve garnished with fresh lovage leaves and accompanied with lots of sourdough bread. Here, lovage is used to complement and intensify the sweet and rich taste of the mussels.

Fresh basil combines with ripe peaches to create an intriguing and spicy flavor that perfectly complements the slightly gamey, complex, rich, but not heavy taste of the rabbit. This dish is also good cold.

Sautéed Rabbit with Peach and Basil Sauce

2 cut-up rabbit fryers

Sauce

4 medium-sized ripe peaches—peeled, pitted and cut into small pieces
3 cups rich, dark brown rabbit or veal stock
¾ cup fresh basil leaves, coarsely chopped
3 tbls. cognac
salt, freshly ground white pepper

2 medium-sized ripe, fresh peaches, peeled and cut into wedges for garnish

Sauté the rabbits: Brown pieces on all sides in hot oil. Add a small amount (about 1 tbls.) stock to pan and reduce heat to low and cover and cook for about 20 minutes. When done, remove rabbit pieces to hot serving platter (or individual plates) and reduce liquid in pan to 2 tbls. and add to sauce. Finish seasoning the sauce and serve over the rabbit. Garnish with fresh basil leaves and the peach wedges that have been gently poached in the sauce for 5 minutes.

Sauce

Simmer peaches and stock in non-aluminum saucepan 45 minutes until peaches are soft and stock is reduced to 2 cups. Transfer to food processor and purée. Return to saucepan and simmer, skimming occasionally for another 15 minutes. Add chopped basil and cognac and simmer for 10 minutes. Season to taste with salt and freshly ground white pepper—it will take more salt than you think. Correct texture by either reducing slightly or by adding more stock. Just before serving, poach the peach garnishes in the sauce for 5 minutes.

Our own improvisation on an old French dish of a sauce made of late spring's tart gooseberries with rich, oily mackerel. Here, the gooseberries are combined with fresh dill and reduced fish stock and served with our lovely king salmon. As in the old recipe, the tart gooseberries are a perfect foil for the rich salmon. However, the addition of fresh dill and reduced fish stock to the sauce produce a wonderful, balanced, focused flavor that enhances the salmon and is truly delicious One of my favorites!

Poached King Salmon Fillet with Gooseberry and Dill Sauce

4 8-oz fresh king salmon fillets

½ pint fresh gooseberries (top and tail ¼ cup of the berries and save for garnish
*4 cups white wine fish stock
½ cup whipping cream
¼ cup fresh dill
Salt, freshly ground white pepper

Sauce

In a non-aluminum saucepan gently simme the gooseberries with 2 tbls. of the stock unti berries are soft. Purée in food mill or foo processor and strain through a fine straine to eliminate stems and skins. Set aside. In non-aluminum saucepan, reduce the fish stock to 3 tbls. (!). Add whipping cream and reduce by ⅔. Add gooseberry purée and dill and bring to simmer. Season with salt and freshly ground white pepper. Correct texture with either more stock or cream, or reduce further. Add topped and tailed gooseberries 5 minutes to gently poach before serving.

*recipe follows

Salmon

Poach salmon fillets in a simple court bouillon (½ leek white, parsley, thyme) until just done—about 10 minutes. Drain and blot the fillets fairly dry in order to avoid diluting the sauce with the poaching liquid from the fish. Serve immediately with the above sauce.

White Wine Fish Stock

4 lbs. white fish bones (halibut is best) rinsed in cold water and cut into small pieces
1 medium onion, coarsely chopped
1 medium leek, coarsely chopped
4 cups dry white wine

In a non-aluminum saucepan, steam the leeks and onions in one half of the wine, covered, until they become translucent and "relax"—about 10 minutes. Add the fish bones and the rest of the wine, cover and steam an additional 10 minutes. Add enough cold water to cover the ingredients. Bring to a boil and simmer, skimming, for 25 minutes. Strain through the finest strainer and/or cheesecloth.

Fresh sage combines with apples to produce a rich, mellow, deep flavor of its own which captures the essence of autumn when combined with the roast pheasant.

Roast Pheasant with Apple and Sage Sauce

2 3½-lb. pheasants, halved
*3 cups dark brown pheasant (or poultry) stock
2 cups coarsely chopped, peeled and cored apples (your favorite sauce apple)
3 tbls. chopped fresh sage
¾ cup whipping cream
¼ cup calvados
salt and freshly ground black pepper
2 tbls. unsalted butter

Garnish

1½ medium apples peeled, cored and thinly sliced
sage leaves

*recipe follows

Sauce

Bring stock to simmer in a heavy medium-sized non-aluminum saucepan. Add apple pieces and chopped sage and simmer over low heat until apples are tender and liquid has reduced by half, skimming surface—about one hour. Transfer to food processor and purée. Sieve through fine strainer into heavy small saucepan, add cream and boil until reduced to saucelike consistency.

Birds

Using sharp knife separate pheasant breast from rib cage (save rib cage for stock!). Leave breasts, thighs, legs and wings intact. Brown all sides in hot oil in roasting pan and roast in hot oven (475°) breast side up about 15 minutes, until juices run pale pink when thigh is pierced. Transfer pheasant to serving platter. Pour off fat from pan. Set pan over high heat, deglaze with 1 tbls. calvados, scraping up browned bits. Add to sauce and rewarm sauce. Season with salt and pepper.

Meanwhile, melt butter in heavy large skillet over medium heat. Add apple slices and cook until just tender and golden brown—about 5 minutes. Add remaining calvados and boil until reduced to a glaze. Spoon sauce onto plates. Top with pheasant. Garnish with sautéed apples and sage leaves.

**Dark Brown Stock*

4 lbs. bones (veal, pheasant, chicken, etc.) cut into small pieces
4 celery stalks, coarsely chopped

1 large onion, coarsely chopped
2 medium carrots, coarsely chopped
small bunches of: thyme, sweet marjoram, rosemary, parsley, bay leaves
2 cups dry red wine

Brown bones in hot oil in large heavy-bottomed non-aluminum stockpot. Brown and scrape bones—about 20 minutes. Add veggies and continue browning and scraping 15 minutes, deglaze pan with red wine. Scrape up browned bits from pan bottom. Reduce wine by ⅔. Add enough cold water to just cover ingredients. Simmer slowly and skim surface for about 10 hours. Strain. Degrease.

This basket contains a charming collection of fresh herbs, including parsley, basil and garlic chives.

Photo by Elvin McDonald

Repeat steps above with fresh ingredients! Add to the first stock. Then repeat a third and final time to make a "third stock"—rich, intensely flavored and dark brown.

Rillettes of Salmon

½ lb. smoked salmon
2 oz. fresh salmon fillet
2 oz. crème fraîche
¼ cup chopped chervil
⅛ cup chopped sweet cicely
½ small leek, parsley sprig, thyme branch

Poach the salmon fillet in a little court bouillon made with the leek, parsley and thyme—about 5 minutes, until just done. Remove salmon from bouillon and refrigerate to cool. Finely chop the chervil and sweet cicely and put in a mixing bowl. Put smoked salmon and cooled cooked salmon fillet in food processor and shred coarsely. Add to herbs in mixing bowl. Add crème fraîche and mix. Mold. Chill. Serve with homemade crackers or sourdough bread.

Homemade Mustard

1 quart water
½ cup yellow mustard seeds
¼ cup fresh sweet marjoram leaves
⅛ cup fresh summer savory leaves
5 tbls. extra virgin olive oil
3 tbls. intensely flavored 25-year-old sherry vinegar (or other intensely flavored vinegar)
1 tbls. manzanilla sherry (or verjus)
¼ tsp. salt

Combine water and mustard seeds in saucepan and bring to boil. Reduce heat and simmer for 15 minutes stirring occasionally Drain seeds, rinse under cold water to coo —being careful not to rinse off all of the mustard oil that coats the seeds. Transfe seeds to food processor and purée to paste Add remaining ingredients and blend well— mixture will not be smooth. Transfer to ja and refrigerate. Prepare a few days in advanc of serving as flavor improves over time.

We love mustard and think everyon should make it! It is as easy as vinaigrette an provides an excellent opportunity to pla with flavor combinations. Think of what th mustard will accompany and imagine. . . . W use the mustard in dressings, marinades mayonnaises. It is a good background fo many sauces. Improves with age in th refrigerator.

Herbs for Short Season, Cold Winter Areas

Diane Bilderback

Herbal breads fragrant with basil, thyme and oregano, lasagna flavored with basil or barbequed chicken spiced with oregano make my family especially appreciative of the herbs grown in our garden here in western Montana. We grow most of our own vegetables and freeze the excess for winter eating; a plentiful supply of dried or frozen herbs adds the much needed spice to our meals during our long winters.

Some winters are mild, while others have temperatures as low as −30 to −35°F. By early December, we often have a foot of snow, which helps protect most of the perennial herbs. (Frequent thaws melt the snow cover, but generally snow is present when we need it to protect our plants from extremely ow temperatures.) Springs are often cold and cloudy, postponing the last frost to the first week of June. Once June, our wettest month, s over, summertime temperatures soar into he 90s during the day, yet can fall into the 40s at night. There is generally little summer ain, making weekly irrigation necessary. The irst fall frosts generally come within the first week of September, making our growing eason often only 90 days long. Despite the limate, it is easy to grow an abundant supply of great tasting herbs.

Tender herbs that won't survive winter temperatures of −20°F and below, or anuals that need to be replanted every year, include all basil varieties, rosemary, chervil, ennel, sweet marjoram and summer savory.

Photo by Elvin McDonald

The author, who uses copious amounts of basil in tomato sauces, grows 30 to 40 plants of 'Spicy Globe', pictured here. Plant 'Spicy Globe' with other basils such as 'Dark Opal' and sweet basil in the border.

These varieties (except rosemary) can be seeded indoors six to eight weeks before planting in the garden after the last spring frost. Rosemary is generally started from cuttings. We plant it out in the garden during summer, then in the fall, dig and place it in our west-facing window for the winter. We use large amounts of basil in our tomato sauces and so grow 30 to 40 plants of 'Spicy Globe' basil. These can be planted with other basil varieties or as a border around other herbs or vegetables because of their unique six-to-eight-inch globe shape. I've also found that this variety can withstand low winter light conditions and does very well when planted in early January and placed in our west-facing window. In March, I transfer the potted plants to a frost-free cold frame and harvest throughout the early spring. Basil is available in wonderful shades of green, red and purple as well as small, medium and very large leaf forms. I like to group them together

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Diane Bilderback has been gardening in lissoula, Montana, since 1973. She has written nany articles for Organic Gardening *magazine,* ational Gardening *and* Family Circle. *Her ooks, written collaboratively with Dorothy Patent, include* Garden Secrets *and* Backyard ruits and Berries.

in the garden. Taller, large-leaved forms such as lettuce-leaf basil or 'Green Ruffles' go in the center, surrounded with smaller-leaved varieties such as lemon basil or piccolo basil. The outer perimeter of the block is outlined with 'Spicy Globe' basil. Spaced about six inches apart, the herbs make solid, colorful blocks. For the fastest growth and best-tasting leaves, plant these herbs in rich, well-drained soil in full sun. Our pH is slightly alkaline (~7.0), but the herbs don't seem to mind. During the last of a hot July and August, I often place a light, two- to three-inch mulch of grass clippings around the plants.

While I do dry these herbs for storage, I also mince large amounts of basil (I use a food processor), freeze it in a ice cube tray and then store the cubes in a plastic bag. While most recipes for freezing tell you to add oil before freezing, I have had good luck freezing the minced leaves alone. These cubes are just the right size to add to lasagna or other Italian sauces, soups or vegetables as they are cooking, and the flavor is closer to fresh than dried basil. For pesto, I defrost four cubes and add ¼ cup parmesan cheese, ½ tsp. salt and 1 finely minced garlic clove and mix well. This mixture is then stirred into 2 cups of hot pasta. While it is traditional to include some olive oil and pine nuts in pesto, we have chosen to leave these items out in an effort to lessen the fat content of the dish.

Some herbs which once planted and allowed to go to seed often magically reappear each spring: these include parsley, coriander (also known as cilantro), dill, arugula or roquette, borage and chamomile. Leave the seedlings where they come up or move them soon after germination to a more appropriate spot. Parsley has been a favorite herb ever since the birth of my second son Chris, who for the first five years of his life wouldn't eat anything green except parsley. We also use large amounts of it in tomato sauce. I grow parsley on my winter windowsill and have found that the curled varieties do better than the flat-leaf varieties under low-light conditions. In the early spring, as soon as the ground can be worked, I plant rows of curled varieties such as 'Forest Green', which has stiff upright stems, and Italian flat-leaf parsley that has a stronger flavor. I also plant smaller rows of cilantro, and the seedlings that appear aren't enough to satisfy our appetite for this herb. Dill, arugula, borage and chamomile reseed themselves so well that I never have to reseed.

Perennial herbs that grow without special winter care include spearmint, peppermint, sage varieties, thyme varieties, true oregano, true French tarragon, lavender, regular and Chinese or garlic chives and sorrel. We love sorrel so much that we have planted a three-foot by two-foot bed which in early spring we cover with a light cold frame. This encourages quick growth and early spring harvests. All these herbs except thyme varieties and French tarragon need full sun to grow quickly and yield abundantly. French tarragon and thyme can tolerate shade for part of the day and still yield well. Of all the herbs, only chives and sorrel really benefit from a yearly addition of compost or manure around the base of the plants. Chives, thyme varieties and sage have such pretty flowers that I placed these in my perennial flower bed. I often dig a small clump of chives in the fall and place it in my cold frame until it is too cold and then bring it in to winter on the windowsill. By the end of January I can begin cutting the tasty leaves.

Our garden is full of interesting rocks and so we planted thyme around some of th landscaping rocks in the perennial bed where it softens the base of the rock and adds an attractive color. Another friend has used thyme and lavender to edge the base of he greenhouse much the same way you would use juniper plantings.

Herbs grow very well in our short but intense Montana summer and provide beaut as well as spice. Drying and freezing allow us to use them all year, but one of the bes ways to use them in winter is to grow thos able to survive our low winter light on th windowsill.

A Lavender for All Reasons

Robert Kourik

My love affair with lavender began during the California drought of 1977 as a matter of necessity. As the planting portion of my business shriveled from lack of water, I began looking for drought-hardy plants to work with. The drought, by taking its toll on established landscapes, slowly revealed, like a grim version of time-lapse photography, which plants could best take the neglect and still look reasonably attractive—and lavenders were one of the champions. *Lavandula* sp. has become a love of mine and one of the three most important plants in my landscape design "palette." (The other two are rosemary and santolina.)

Since I have always lived in "wild" areas on the fringe of urban communities, deer browsing has always been a big concern of mine. Oddly enough, as a very general rule, native California plants are not that deer-resistant in a domesticated landscape setting—especially an irrigated one. It's the Mediterranean plants and, more specifically, the lavenders, which have proven to be most reliable at staying off the Bambi menu. After 15 years of landscaping in deer-browsing territory, I can state from observation that avender plants remain virtually untouched. Planted correctly in the proper soil and climate, lavenders can easily be sustained with as few as two irrigations during an entire rainless California summer. The larger, shrubby lavenders act as effective weed suppressants since their two- to four-foot-tall canopy shades out germinating seeds. Equally important, lavenders require very limited shearing to maintain a pleasant and attractive form. All of this saves on the cost and time of installation and maintenance.

The "three D's" (drought, deer and dollars) are my most important *practical* reasons for planting lavenders. But the reasons I have for loving, collecting and growing so many forms of lavender around my house have to do with aesthetic and sensual virtues. The wide range of foliage and flower color, the seductive variety of sweet-pungent fragrances, the tantalizing possibilities of use for cooking, grilling and making ice cream tickle my fancy, my tastebuds and my creativity.

Soil Preparation

Contrary to regular garden practice, I always amend my small planting mounds for lavenders with the addition of plenty of gravel. Drainage is so critical to lavenders that, in any form of a clay loam, the addition of gravel, sand or a similar non-nitrogen amendment for drainage is absolutely *essential*. When in doubt about the drainage of a particular garden soil, amend raised planting

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Robert Kourik is a landscape designer who lives and gardens in Occidental, California. His specialty is edible landscaping, and he has written for many magazines, including Organic Gardening, Fine Gardening *and* Horticulture. *He is the author of* Designing and Maintaining Your Edible Landscape Naturally.

mounds or plant in a container filled with a well-drained potting mix. The single most important lesson when gardening in Mediterranean ecosystems is that providing the essential drainage is not only critical but makes for *better* plant growth; and at the same time, the *watering* needs are *not increased*, they may actually be *reduced*.

My Favorite Lavenders

My little list of favorite lavenders is based on the most common "trade" names, as used by the local wholesale nursery growers. This list comes from 10 years of using lavenders in landscaping and, more importantly, cultivating nearly two-dozen varieties around my home.

Photo by Elvin McDonald

The lovely spikes of blooming lavender add fragrance to the air and beauty to the garden. Lavenders work well as small, discreet hedges.

Photos by Robert Kourik

Lavendula angustifolia *is one of many lavender species that perform well in the author's California garden. These plants also have the distinct advantage of being deer-proof.*

Scent-sational

When it comes to the sweetest, best-scented, most-pungent lavender debate, I throw my Greek fisherman's hat into the *L. angustifolia* 'Provence' circle. I got my first plant from Louie and Virginia Saso in Saratoga, CA. The Sasos have been collecting herbs, landscaping their home with herba gardens, teaching herb crafts and growing and selling organic herb plants for many decades, and I've been making yearly pilgrimages to this delightful herbal mecca fo nearly 15 years. When Louie said 'Provence was the finest-scented, sweetest-smelling most-aromatic of all lavenders he's grown, bought one instantly, and I think he's right Sarah Hammond of Smith & Hawken's nursery also includes 'Provence' in her list o most powerfully scented lavenders. It ha very fat flowers, nearly an inch in diamete at the top one and a half to two inches of eac stem. The flowers are so luxuriant and heav that overhead irrigation, even heavy fog, ca temporarily knock them over.

Colorful Lavender Blossoms

For sheer drama and rich color of blosso my vote goes to *L. stoechas*, correctly calle French lavender but sold as Spanish lavende around here. In the linguistic gymnastics o *Hortus Third*, the flowers are "oblon obovate, to 2 in. long, verticillasters 6-10-fld calyx to 25 in. long, 13-nerved, corolla da purple." (!) What excites me is the spectacularly rich, royal purple "flags" that stan straight up from the top of the flower. The beauty of French lavender has inspired me to spend considerable time reviving my long-lost love of super-closeup floral photography in an attempt to capture the naked, abstract "essence" of the blossom. My favorite-named variety for these floral "nude studies" is *L. stoechas* 'Atlas'. This one has by far the tallest, ost regal "flags." Again, I found my first model" at the Sasos' landscape nursery. A lose contender for bud size is *L. stoechas* tto Quest', which is much more prevalent the average wholesale and retail nurseries. he species (unnamed selections or seed-own plants) form of the French lavender as dramatically smaller blossoms, only up five-eighths of an inch compared to the ree-quarter- to one-inch-long buds of 'Otto uest' and the nearly one and one-half inch ds of 'Atlas'. The advantage to the species rm is its well-behaved plant shape and duced shearing demands. And again, remember that those plants selected for huge blossoms flop over easily and can't take overhead irrigation or rain.

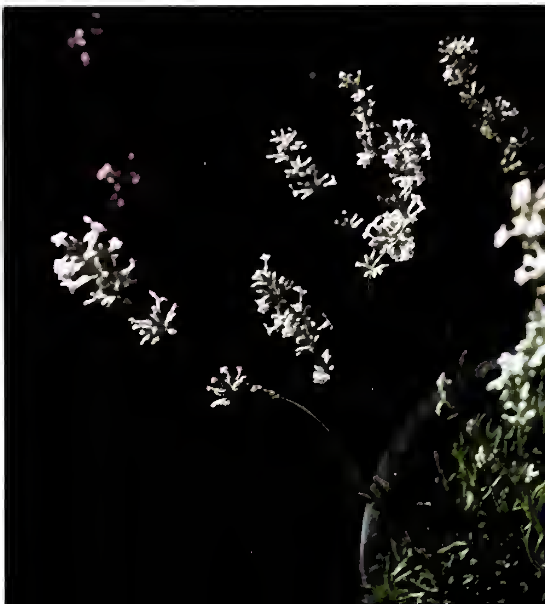
. stoechas *produces spectacular rich, royal urple "flags" that stand straight up from the op of the flower. The plant shape is well ehaved, which reduces shearing.*

For a subtlety of color that is cool, relaxing and so delicate, I use the unique *L. angustifolia* 'Jean Davis'. This somewhat petite lavender has small, pale pink blossoms on slender stems. Some people refer to the bloom as white, but it's most accurately described as a creamy, pastel pink of the most delicate shade. The foliage, with a typical gray-green lavender color, and blossoms fit quite nicely with designs that feature silver-gray and dark green foliage and white or royal purple and blue blossoms. One particularly nice mixture is *L.* 'Jean Davis' in the foreground with rivulets of the more richly pink, gossamerlike blooms of Mexican evening primrose (*Oenothera berlandieri*) flowing behind and around the lavender. The plant seems a touch delicate, not able to take the same amount of neglect as most lavenders.

Low-Maintenance Lavenders

As mentioned above, the "three 'S's"—Spanish, Sweet and Spike lavenders—offer

L. angustifolia *'Jean Davis' has small, pale pink blossoms on slender stems. The plant is delicate and combines nicely with* Oenothera berlandieri.



more low-maintenance benefits to any landscape than even most other lavenders. The true French lavender is not tall enough to shade out all germinating seeds, but needs very little shearing to stay in a compact, half-spherical form.

Landscape Design with Lavender in Mind

I have, or make, many occasions to add lavenders to the plans of my clients, mainly to help create what I call drifts or swales of color for the primary "wash" of the design. I think of garden design as a process resembling a watercolor painting, the first step being to lay down a pale "wash" (thin liquid color) of primary, background color against which main highlights and accents will appear.

Many of the natural plants in the California chaparral grow in fairly large, pure stands due to their physiological competitiveness (such as when they give off allelopathic chemicals that stunt the growth of other plants or prevent the germination of their seeds), so I create portions of my designs to reflect this pattern. The soft tones of blue-gray, glaucous, and green-foliaged lavenders fit nicely with my vision of a natural chaparral look. Like the evergreen chaparral, the foliage of lavender provides an intriguing, but not too intense, color all year, regardless of the season. By planting large clusters of lavender on top of raised mounds in meandering patterns, I intend to mimic the image of the large, oddly shaped pools of single-species plants that are often found in chaparral communities.

Since it is rare that chaparral communities are composed of entirely silver-gray, glaucous-foliaged plants, I often turn to dark green evergreen plants, which provide an interesting foil or counterpoint to the lavender, making the silver-gray leaves look lighter colored and enhancing their blue tones. Conversely, the lavender's foliage makes the evergreen's foliage look even richer and deeper. For these dark-green foils, some of the plants I use include: *Myoporum parvifolium* 'Pink', rosemary (*Rosmarinus officinalis*), sticky monkey flower (*Mimulus* sp.) and common thyme (*Thymus vulgaris*). Often, I place the low-growing *Myoporum parvifolium* 'Pink' or common thyme beneath a lavender to grow out from under its foliage like a dark green skirt, setting off the gray-green foliage above.

Lavender naturally grows in a well-behaved, mounding form. This soft, half-spherical shape becomes a welcome contrast to straight structural lines on the house or in the landscape. A four-foot-tall lavender, combined with several other rounded shrubs, can be used to soften the edges or corners of a house. I most frequently use lavenders as small, discreet hedges to hide the straight, wooden edges of raised vegetable beds. Because gophers are so prevalent in our area, raised beds with wooden sides and aviary-wire bottoms are essential to a garden's survival. The hard line and rigid geometry o these boxes has always troubled me as a designer; sometimes I just celebrate th geometry, even making it more prominent as an intentional design theme. Otherwise, often use sweeping hedges of lavender t soften the architectural nature of the beds. I one landscaping job, the wooden boxes wer placed perpendicular to a large gradual curv facing south. Along the southern edge, planted a long hedge of *L. angustifolia* t match the sweeping curve. As the lavende never gets above 18 to 24 inches, it doesn significantly shade the vegetables, and do some nice things besides softening the box look. It separates the lawn area from th food-growing area, hides the irrigation pip that enter from the southern sides of the be sweetens the garden atmosphere—especial when in bloom—provides fresh flowers f bouquets, cooking and grilling, keeps th bees well-fed, makes a striking accent wh in full flower and attracts many beneficial i sects to its flowers.

BORDERLINE HERBS

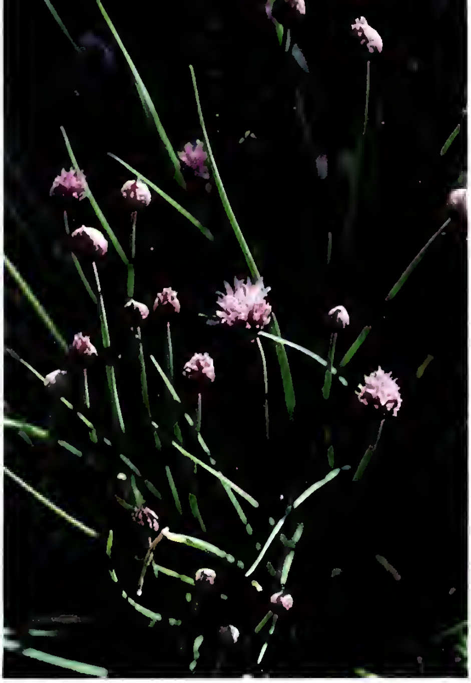
A choice handful equally useful in border or kitchen

Ann Lovejoy

We could never find room in our tiny city garden for a real herb garden, but there are a few culinary plants we couldn't do without. Given thoughtful treatment, most herbs perform very nicely in a mixed border, and some are so lovely that I would grow them even if we didn't enjoy their flavors. Here are a few of the outstanding basics which are both savory and beautiful for most of the year.

Finocchio, or Florence fennel, is a great favorite of mine, not only for the fat "bulbs" that form at the base of this billowy plant, but for the aromatic, plumy foliage. It is not unlike dill, but thicker, and softer in effect. A well-grown plant will make a dense, columnar bush fully six or even eight feet high and nearly three feet across at its middle. Does that sound like too much of a good thing? At ground level, it really takes up very little room, and can be planted where the emerging foliage will first mingle with, then cover up the fading leaves of spring bulbs. It is a great mistake to worry too much about scale n a small garden, and a few oversized gems ike this will bring you enormous pleasure. When wet, this great spangled thing glitters ike a fountain, each drooping leaflet carryng a shimmering silver drop. In the fall it colors warmly, taking on tints of copper and bronze. By midwinter it has lost a good deal of its charm, but when the old stalks are cut down a whole fluffy wealth of new greenery s already on its way up, and very welcome it is, too. I grow a small row of fennel plants in the vegetable garden as well, where they take up very little room; there they are grown as annuals and harvested fairly small, just as the bulbs fatten up. My big border fennel is four years old and still going strong.

There is a pretty variety of the common fennel (the one that does not make big "bulbs"), which has foliage of bronze or copper. This makes a comparatively smaller plant, perhaps three feet tall, slim and airy. This can be planted in small thickets of three or four plants as a splendid background for flaming red *Cosmos* 'Diablo', daylilies, whether the smoldering red-black 'American Revolution' or fiery crimson 'Cup of Rubies', cinnamon red 'Pirate' lilies or the old fashioned red hot poker, *Kniphofia (Tritoma) uvaria*. A subtler effect, equally wonderful in a quiet way, comes from bronze fennel banked with apricot and peach-toned daylilies, 'Three Bars' and 'Knockout', and another *Kniphofia* 'Primrose Beauty', this one with lily-wands of pale yellow. Several single plants can be tucked about in a small shrub border for a pleasant deepening tone and light feeling. In the herb garden, try it with purple-leaved perilla, that cinnamony-basil flavored herb so often used in Japanese cooking, and the lemon-lime form of cooking sage or fluffy golden marjoram. Even without flowers this group is spectacular, in the very best sense of the word.



Photos by Elvin McDonald

Allium schoenoprasum, *chives, grows in most gardens and graces them with fat purple flower balls that look especially pretty when backed by the fuzzy silver leaves of lamb's ears.*

Most gardens have some chives, and the long-blooming, fat purple flower balls look especially pretty when backed by the fuzzy silver leaves and tall purple and silver towers of lamb's ears. Chives have a more elegant cousin which is less often grown, though just as easy to please, and far more useful in a mixed border. This is garlic chives, *Allium tuberosum*, the flowers white in a wide and delicate umbel. They also bloom for a long time and smell quite sweet unless bruised or cut. We have them fetchingly sandwiched between a low sprawling rose, 'The Fairy', with small pink pompom flowers for much of the year, and a pink jasmine. Garlic chives will seed themselves around a bit, yet they are so attractive, and so easily removed if not wanted they are never a nuisance.

Parsley is such a pretty plant that I grow it in its several forms even though we rarely cook with it. The flat Italian kind is useful in vases with smallish cut flowers, lasting very well, and the plants bring that fresh, lively color and light texture to our small shrub and bulb border. The frizzy, crimped types are as much fun to use as the various dusty millers, and the two together can make an uninspired planting hum with energy. An ordinary hanging basket of scented purple and pink petunias needs only a few additions to be something quite special; a tumbling white pansy (a climber going the wrong way), some ruffled parsley and the lacy silver dusty miller 'Diamond' will turn it into a complex and lively grouping.

Clearly there are many ways to get a few herbs into the act without giving them proper bed of their own. Thymes of all sort are evergreen and always attractive, whethe creeping or clumping, green or gold or gray Feathery dill and lacy lovage lighten heavy foliage in shrub borders. Dramatic angelic looks wonderful behind billowing perennials. Blue-flowered borage blends with othe self-sowing annuals in bright abundanc Silvery lavender, bushy rosemary and cut leaved tarragon can all be introduced t mixed company without any fuss or worr Nestled in with all the border beauties, thes humble escapees from the kitchen garde look good enough to eat. The only difficult is getting them out of their beds and into th kitchen. ✻

Parsley is such a pretty plant with a fresh, lively color and light texture that it is a pleasant addition even if not used in cooking There are several types to choose from.

TEA LEAVES

Herbs to blend and brew

Patrick Lima

Larkwhistle garden grows a score or more of tea herbs. An essential step in the tea ceremony here—at least during the seven-month growing season—is to take the teapot into the garden and fill it loosely with an impromptu blend of fresh herb leaves and sometimes flowers or seeds as well. One morning it will be a citrus-sweet mixture of lemon balm, lemon verbena and anise-hyssop leaves, with sprigs of spearmint and unripe seeds of sweet cicely. Another day it will be a tonic, slightly bitter brew of sage combined with a bit of rosemary, a smidgen of rue and a few flower heads of common yarrow. A favorite blend has lemon balm, spearmint and orange mint as the dominant flavors, with a leaf of sage and a sprig of rosemary and a few leaves of anise-hyssop or sweet cicely for sweetness. Into the pot may go calendula flowers, the fragrant petals of old-fashioned roses, leaves of scented geraniums or spikes of flowering lavender. In the evening we have a sleepy tea of catnip leaves and chamomile flowers with a little mint to temper the medicinal edge. Sometimes I brew a bouillonlike tea of parsley, lovage, savory, dill seeds, chive blossoms, thymes or other

Photos by Elvin McDonald

Tea made from mint is stimulating and refreshing. The plants are easy to grow, but must be contained so that they do not invade the entire garden. Tea made from sage is milder and is said to have medicinal benefits.

A few flowers can be added to tea blends. Pictured here are sprays of lavender—the florets can be floated in herbal teas. Floating on the surface is a lovage flower.

Patrick Lima and his partner, John Scanlan, live and work in their beautiful garden, Larkwhistle, in Ontario, Canada. Lima has written extensively for Harrowsmith *magazine, and his books include* The Harrowsmith Perennial Garden: Flowers For Three Seasons *and* The Harrowsmith Illustrated Book of Herbs.

potherbs salted with a few drops of tamari or a daub of miso paste.

Blends vary with the seasons—summer teas often include lemon or cinnamon basil or leaves of the tender tropical sages or a bit of one of the milder-scented geraniums. Seldom is one pot of herb tea just like another. But besides their endless variety, herb teas have a lot going for them. They are homegrown and hence can be free from the pesticides and other chemicals routinely used in the raising, processing, packing and shipping of commercial herbs. They cost nothing beyond a small sum for seed or starter plants and, best of all, the plants themselves are among the easiest in the garden to grow.

Mint

Mentha spp, *Pycnanthemum pilosum*

Growing with such abandon that they need occasional restraining, some mints are distinctly pushy plants moving in on neighbors by surface runners or underground rhizomes. A few, however, are worth growing in corners of the garden where they will not menace other things. One member of the family, peppermint, makes the most familiar of all herb teas. But if the reaction of visitors to a whiff of the head-clearing fresh leaves in our garden is a clue, few gardeners know the true peppermint (*Mentha piperita*), which smells, as might be expected, like those red-and-white-striped Christmas candies or a peppermint patty—it is sometimes sold as candy mint. *M. piperita* may also be labelled black peppermint in reference to its purple-brown stems and top leaves suffused with deep violet. Still, it is wise to taste before buying. Even a nibble of true peppermint will fill the mouth with the characteristic mentholated coolness that identifies it.

Peppermint is a hybrid plant. "Seeds sold as peppermint," states one herb catalog, "are never true to name; quality strains can only be grown from cuttings or divisions." In our garden peppermint is the least expansionist of mints; our small clump barely maintains itself in a corner of a raised bed where six other species jostle for root room. But in a neighbor's garden a slip from our plant has covered a wide swath of ground in the shade of some old apple trees. Peppermint craves partial shade, good black loam and moisture —one parent is water mint (*Mentha aquatica*), a vigorous plant that grows beside streams throughout Europe.

"Peppermint will stimulate like a glass of whiskey," Jethro Kloss says in his book of herbal medicine, *Back to Eden*. An overstatement, but there is no doubt that strong peppermint tea is a potent drink. I have hearc several people say that they cannot take thei mint tea strong and straight—"it goes righ through me." All the herbals agree that the active constituents of peppermint act on th organs of digestion; the tea (or oil, whic contains about 50 percent menthol) is recommended to allay stomach cramps, nausea, abdominal pains and the like.

Peppermint's other parent, spearmint, i far more common in gardens. It can be distinguished from peppermint by its leaves which are uniformly green, pebbled, longe more pointed and toothed along their margins—spiked, in fact, as the Latin *Menth spicata* tells us—while peppermint leaves ar smooth-edged. Southerners call it julep mint alternate names, lamb mint and pea mint indicate that this is the plant for genera culinary use in sauces and jellies or mince over boiled potatoes, steamed carrots or fres peas. A little spearmint clipped into green grain or potato salads dressed with yogurt i a cooling touch. The scent and flavor o spearmint, milder than peppermint, blend well with other tea herbs, such as balm, anis hyssop or chamomile, whereas peppermi would overpower them.

A pretty sport of spearmint is curly mi (*Mentha spicata* 'Crispata'), whose leaves a twisted, waved and crimped along the edge Gardeners with limited space might gro curly mint in preference to its parent for th

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**Excerpted with permission from* The Harrowsmith Illustrated Book of Herbs sake of its decorative foliage. I have noticed, too, that curly mint never succumbs to the spotty fungus disease that sometimes bothers other species.

Different from other mints is one with the fragrance of eau de Cologne. Orange mint (*Mentha citrata*) is also called bergamot mint because of its resemblance to *Monarda didyma*. Too perfumed, for my taste, to make a good tea on its own, a few sprigs of orange mint will add a unique bouquet to a blend that may include lemon balm and anise-hyssop. Attached by short stalks to the square stems typical of all mints are broadly heart-shaped leaves; these and the unusual fragrance identify orange mint.

For sheer beauty of leaf, no mint can match the variegated form of apple mint (*Mentha* x *rotundifolia variegata*), also called pineapple mint. Apple-green, woolly rounded leaves smelling of apples and spice are flecked and bordered with creamy white. Not as determined a spreader as some, apple mint is an easy herb for massing in a lightly shaded corner of a city (or any) garden where height —about three feet—and highlights are needed. I have seen it given a prominent place toward the front of English perennial beds as an effective foliage accent.

Equally decorative is golden ginger mint (*Mentha* x *gentilis aureo-variegata*), sometimes called American apple mint. (Given the many and similar common names, it is easy to see how useful the Latin can be.) Smaller, serrated (botanically called toothed or dentate) green leaves are shot through with yellow and cream. To my nose the scent resembles tangerines. In our garden a clump of American apple mint grows at the side of a concrete watering pool, where it seems to appreciate the shade and dampness.

Mints are the easiest plants to propagate— and, in fact, are more likely to need curbing. Any shoot eased from the ground is likely to have a few roots. Planted firmly in a new place, it soon takes hold and starts to travel. Gardeners go to great lengths to confine mints: sinking sheets of metal, even used license plates, around a patch; hauling old tires into the garden; planting in containers of all sorts. Wooden wine-barrel halves are my choice for mints and most other herbs because they are not porous like clay, so far less watering is required—nor have I ever seen clay pots as large. A half-barrel will contain three species of mint comfortably. But each spring, the tangled mat of roots that will fill a barrel in a season must be pried and pulled out just as growth begins, and three to five shoots of each type replanted. If a single species grows in a half-barrel, it can be left for several seasons.

With mints one can have one's tea and bathe in it too: the long branches of any fresh mints (but especially orange and peppermint) swished vigorously back and forth in a tub of hot water, then left to swirl under the faucet, make a fragrant bath; or simply empty a teapot full of a strong, minty brew into the tub. The practice is an old one. John Parkinson, apothecary to King James I and author of two 17th-century herbal classics, wrote, "Mints are sometimes used in the bath with balm and other herbs to comfort and strengthen the nerves and sinews." Since mint is a reputed anodyne—an agent that soothes pain—and is also recommended to relieve itching skin conditions, a mint bath may be as therapeutic as it is pleasant.

Far too small to be easily picked for tea, let alone a bath, the ground-hugging half-inch-tall Corsican mint (*Mentha requienii*) is nevertheless a sweet plant that will creep between paving stones or carpet a shaded slope of the rock garden, if it is not harassed by stronger plants. This herb has the tiniest flowers of any plant in the garden—a little pale lavender galaxy—but honeybees crawl eagerly over the small-leaved mats. Native to a warm Mediterranean island, Corsican mint is not as easy as some to keep over the winter —the herb lady who sold us a starter plant pronounced it "definitely tender"—but under the snow, small patches always squeak through and grow over the summer to fill in the bare places. A springy mulch of evergreen boughs (not matted leaves) is recommended protection where freeze and thaw is the winter pattern. Some gardeners recommend removing the mats of Corsican mint to a cold frame or even indoors over winter, but I confess that my interest in a plant wanes if I have to move it twice a year. Only the decidedly tender rosemary, lemon verbena and several tropical sages (all good tea herbs) receive that attention.

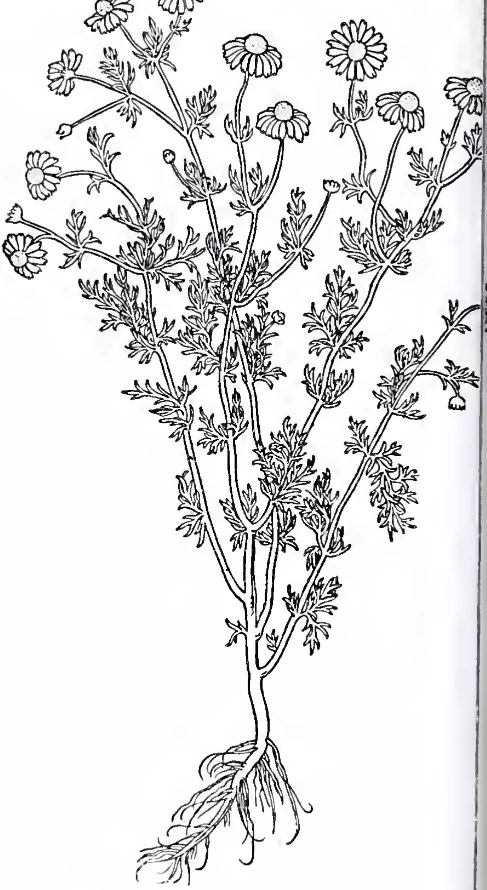
Despite its name, mountain mint (*Pycnanthemum pilosum* or *Koellia pilosa*), a hardy American native, is not a species of mint at all, although it is a member of the same family, Labiatae, to which mint, bergamot and several other herbs belong. Its crushed leaves are redolent of peppermint and may be used in the same ways. Three-foot-high mountain mint does not creep but returns each spring wider by just a shoot or two. Nectar-hungry insects are drawn to the dowdy whitish flowers; I have counted four species of butterflies feeding at once, as well as a bevy of bees and smaller flying things. The flowers must brim with an unusually sweet nectar. Grow this plant from spring-sown seed or starter plants; our specimen lives in sandy ground in full sun but would probably respond to soil enrichment with more lush growth.

Chamomile

Chamaemelum nobile, Matricaria recutita

A sprinkling of seed scratched lightly into any piece of sunny ground in spring will provide chamomile in perpetuity. What you sow, you reap. The choice is between the creeping perennial Roman chamomile (*Chamaemelum nobile* or *Anthemis nobilis*), a colonizing species that grows so thickly it has been used as a ground cover for paths or as a lawn substitute—"so that being trod upon, the scent is set free to regale and invigorate the passerby," wrote one gardener—and the annual German wild or sweet-false-chamomile (*Matricaria recutita* or *M. chamomilla*), sometimes judged better for tea.

I grow annual chamomile, or rather it has grown itself for years, with no attention except thinning (to three or four inches apart) the dense crop of fine-leaved seedlings that springs up every season and weeding out their increasing kind from the paths (maybe I should leave them) or from the crowns of pinks and dwarf catnip edging a bed opposite. It is wise to grow chamomile (both the self-seeding German and the creeping Roman) in the vegetable garden—perhaps a the end of an intensive bed or in the corne where seedlings may remain undisturbed Grown anywhere near other small herbs or perennials, seedlings become a nuisance lodging where they will.



Chamomile
Matricaria recutita

In preparing chamomile tea, remembe that it is easy to oversteep the flowers pas pleasant and fruity to bitter; equal part chamomile and spearmint or lemon bal leaves make a more mellow brew, and a scan teaspoon of dried chamomile makes a cup o tea. Once dubbed "the plant physician," chamomile produces one of the most venerable herbal brews, long popular in the home medicine chest to soothe and strengthen stomachs and to calm restless or feverish children. In her book, *A Modern Herbal*, published in 1931, Maud Grieve says of the plant, "It has a wonderfully soothing, sedative and absolutely harmless effect." This is another herb tea to pour into bathwater; a little can be reserved for rinsing the hair to bring out highlights.

Chamomile has a reputed influence not only upon "frail humanity in distress," as one herbalist put it, but also upon other plants; grown near "weak or ailing plants, it exerts a strengthening influence." Cooled tea sprayed over a flat of seedlings, or dried chamomile flowers scattered between them, is said to reduce the risk of damping-off, a fungus that can lay low a batch of small plants in short order.

There is but one difficulty in growing chamomile: harvesting the flowers is like picking wild strawberries—it takes forever to fill a teapot or to gather enough to pack dry into a jar for winter teas. This is work for a sunny Sunday when one is content to sit in the chamomile patch, under the shade of a wide-brimmed hat, and just pick. We harvest chamomile flowers first when the patch looks to be in full flower, taking small button buds, the wide-open flowers and everything in between. Soon, this generous herb is full of blooms again; three or four successive pickings are possible if patience, ever a virtue in gardening, persists. To dry chamomile flowers for tea, spread them in a single layer on a screen in an airy, shaded place out of the way of rain or dew, stirring and turning every few days until the flowers appear desiccated. Then store for a while in a punctured paper bag to ensure that drying is complete, lest the bulky flowers mold in closed jars.

Bergamot

Monarda spp.

Goodness and moisture, too, are needed for *Monarda didyma*, another herb of many names—bergamot, bee-balm, monarda, Oswego tea. This is a favorite of mine on several counts. The whole plant—flowers and leaves (and roots, says one writer, although I have not investigated that claim)—smells deliciously of oranges and spice; the leaves add a special bouquet to a tea blend, similar to the flowery essence that pervades Earl Grey tea.

Bergamot is a North American native. In 1744, so the story goes, Virginia farmer and amateur botanist John Bartram collected seeds from stands of red bergamot found growing near Oswego, New York—both the town and the tea received their names from the Oswego Indian tribe that lived in the region and apparently used several species of *Monarda* to flavor their food. Bartram sent seeds to English horticulturist Peter Collinson who recorded that "plants flowered the next year, and by 1760, there were plenty in Covent Garden Market." Two centuries later, there are plenty in this garden, too, and I wouldn't want it otherwise.

Crowns of tubular flowers, sometimes one atop the other, may be shades of purple or rose-pink. For curious gardeners, seeds of the 'Panorama' strain will flower in a range of colors the first season. But better are the named varieties of plants: 'Croftway Pink' is one cultivar to look for, and best of all is the glowing red 'Cambridge Scarlet', always alive with hummingbirds performing their aerial acrobatics. Bergamot colors for weeks in July and early August. Each season, I find a new corner that would be brighter for a plant of bergamot, perhaps behind a cloud of baby's-breath or in front of the reaching spires of delphinium or dusky blue aconite. With tall lilies and day lilies of any color, three-to-four-foot-tall red bergamot makes a fiery picture.

Bergamot is amiable enough if its few specific needs are met. Give it organically enriched ground that does not dry out, or it will lose its lower leaves and become stunted. Give it elbowroom and good air circulation, or it will become lanky and mildewed. Divide it first thing in spring or early in autumn, or it will spread, mintlike, into a choked mat of weak shoots. Division is easy—all the roots are near the surface—but the gardener must ruthlessly toss out the spent center of the clump and retain three-shoot segments from the outside as new plants. Set these firmly, and a little deeper than they were growing, in the best ground you can manage in sun or partial shade. Thus treated, bergamot will be the jewel of the July garden, and its leaves will make many a cup of fragrant tea.

The delicate lavender flowers of wild bergamot (*Monarda fistulosa*) decorate roadsides, thickets and clearings throughout parts of eastern Canada and New England. At one time, native people steeped the leaves into a medicinal tea for mild fevers, headaches, colds and sore throats; other herbalists speak of bergamot, a general tonic, as a specific for stomach ailments. The genus is named for Spanish medical botanist Nicholas de Monardes, author of a book pleasantly titled *Joyfull Newes out of the Newe Founde Worlde.*

Anise-Hyssop

Agastache foeniculum

Although it is little known and seldom grown, anise-hyssop is good company for balm in both the garden and the teapot. This three-to-four-foot-tall easy plant, always surrounded by honeybees and butterflies when in flower, ought to have a place toward the back of a bed of tea herbs. Leaves scented of anise and mint—licorice-mint is another common name—clothe square stems topped with short but showy spires of bright lavender flowers. If hung upside down in an airy, shaded place, the flower spikes dry as easily as yarrow for a winter bouquet. Since the shrivelled leaves are not decorative, they can be stripped for tea.

Just once have I seen these plants for sale; and anise-hyssop does not spread by runners as do plants of the genus *Mentha*. But spring-sown seed grows usable anise-hyssop in a season; left to seed, it scatters a colony of young plants at its feet. In hot, starved soil, this hungry herb grows stunted and weedy-looking, but given moisture and goodness (old manure, compost, peat moss and the like), anise-hyssop is an ornamental that provides weeks of late-summer color and months of fresh licorice-mint leaves for tea.

Costmary

Chrysanthemum balsamita

In old abandoned farm gardens near my home, costmary has stood its ground against encroaching field flowers and grasses for half a century or more. My elderly neighbors know the herb as "sweet Mary," but none can recall just what their parents or grandparents used it for—"probably tea" is the usual guess.

A close botanical relative of the feathery, dark green tansy (*Tanacetum vulgare* syn. *Chrysanthemum vulgare*), costmary, in contrast, grows smooth, elongated, oval leaves, toothed along their edges and lightly silvered with a coating of countless minute hairs. Its flowering stems support clusters of small, yellow tansylike button flowers (actually the central disc of a composite or daisy flower minus the surrounding florets) on three-to-five-foot stems. Given costmary's persistence in old gardens, it is no surprise that the herb takes to sun or light shade, dry or moist ground and forms an enduring clump in a season or two.

To my nose, the scent of costmary is a mixture of mint and wormwood, an aroma once described as "vaguely reminiscent of 'morning bitters', whiskey with bitter herbs." Bitterness is all that comes through if costmary is nibbled, yet the herb was once included in every "Sabbath posy," a nosegay of aromatic leaves and flowers carried by churchgoers to amuse the nose and titillate the taste bud during drawn-out sermons. At meeting's end the long leaves were tucked between th pages of the Good Book, a custom reflecte in the name Bible leaf.

Today, this stalwart old herb, "once very common in all gardens," according to a 16th century writer—and amusingly listed a "new for '86" in a recent herb catalog—is appreciated (again) by herb-tea fanciers for the balsamic bite it gives to a blend of milder herbs. The licorice sweetness of anise-hyssop or sweet cicely, or the citrus taste of any of the leafy lemons—balm, verbena, thyme and geranium—all temper costmary's edge. In any case, the bitterness of a nibbled leaf is considerably mellowed by several minutes' brewing. Ordinary black tea can be spiced with a bit of costmary (and any other tea herb for that matter). But, like the early New World settlers, I sometimes enjoy a cup of costmary tea straight.

Horehound

Marrubium spp.

If costmary can be pleasant on its own in tea, horehound cannot. Whether brewed or chewed, this is a bitter herb that tastes as if it just might be as good a medicine as it has been reputed to be. An infusion of horehound is meant to remedy a weak stomach or lack of appetite, while horehound tea, syrup or candies have alleviated coughs, colds and sore throats for many centuries.

In our garden woolly, silver-green tufts of horehound appear here and there, like catnip; grown originally from seed, it can be counted on to naturalize itself. It is pretty enough for a corner of a flower bed—its two-foot height can be attractive in dry places where other plants are reluctant to grow.

Roses

Rosa spp.

Among the most exotic flowers for the teapot are roses, although it is the fruit of the rose—the vitamin-C-rich hip, or hep—that is most often brewed. The species *Rosa rugosa* and its many named selections produce some of the biggest and most prolific hips. Unlike modern hybrid tea roses, lanky prima donnas which demand that a gardener keep them warm in winter, fend off pests that might annoy them and generally keep them in good health, rugosa roses flourish even in sandy ground, are ignored by insects of all sorts and are hardy without protection even in the northlands and on the prairies. Rugosa is a rose that yields fragrant flowers from mid-June through July, then opens a blossom or two until September when it regains a rosy fall glow.

Why doesn't every garden grow at least one bush of *Rosa rugosa*? Perhaps the tag "shrub rose" has frightened some gardeners who envisage a space grabber, but this prickly beauty needs less room than a suckering lilac or a straggling (and none-too-hardy) forsythia. Some gardeners feel that any rose more exuberant than a spindly hybrid tea has gone wild—and indeed, *Rosa rugosa* has created weedy thickets in parts of New England and farther south—or that a rose is only a rose if its petals spiral formally into a tight, high-centered blossom, beside which the blowsy rugosa bloom seems not quite elegant. The color of the wild rugosa rose is magenta, sporting simple, open, five-petalled flowers. Let us call the rugosa flowers informal and appreciate the plant's many good qualities.

Canadian hybridizers have always been keen on improving the Japanese native *Rosa rugosa* as well as the numerous wild single-flowered rose species that grow across the country. During the 1920s, in Ottawa, Isabel Preston turned her considerable skill from lilacs, lilies and the Siberian iris to *Rosa rugosa* and left as a legacy a willowy (to five feet) amber-cream cultivar named 'Agnes'. More recently, gene jugglers in Morden, Manitoba, and in Ottawa have introduced a bevy of hardy beauties, many of which have double blooms—that is, flowers with at least twice the normal number of petals.

Along a 75-foot stretch of rail fence, we have planted a selection of rugosa hybrids. The two fall days given to digging holes (18 inches deep and wide), removing subsoil, piling in a nourishing mixture of old manure, topsoil, peat moss and bone meal, well stirred with a spading fork, and finally setting in the stripling bushes have yielded perennial returns in flowers, fragrance and fruit. The dense hedge also buffers westerly winds that would otherwise chill the vegetable garden.

If one is after a crop of rose hips for tea, the rugosa roses are among the best, but understand that not all cultivars are created equal. 'Martin Frobisher', listed as a rugosa hybrid, produces no fruit in this garden, nor does 'Agnes'. 'Hansa', six to eight feet tall, well known and overly vigorous in most gardens, has loose wine-colored flowers and only a few large hips. 'Jens Munk', five to six feet tall, opens pure pink semidouble flowers followed by lots of marble-sized crimson hips. Most productive of large, orange-red hips is 'Scabrosa', a restrained and elegant four-foot shrub carrying wide-open single flowers, mallow-pink with a center of creamy stamens. Of those we grow, the latter two are my choices for hip production.

Pick rose hips when they are plump and red but not softly over-ripe; trim the stem and blossom end, cut the hips in half, scoop out the seeds and fibers with a small spoon, and dry the halves on a screen in an airy, shaded place indoors. Dried rose hips are as hard as coffee beans; to make tea, pulverize a handful in a blender, grinder or mill and steep for at least 10 minutes with other herbs, dry or fresh, for more flavor.

Lemon Balm

Melissa officinalis

"Comforts the heart and driveth away melancholy and sadness," wrote English herbalist John Gerard of balm, in the 16th century. Almost every potful of fresh herbs I pick for tea includes a generous helping of lemon balm leaves. Few herbs are as sweetly cordial—the scent is citrus but not sharp, much like the bland, refreshing *limón dulce*, or sweet lemon, eaten like an orange in Mexico and points south. Here is the perfect tea herb. The mild flavor blends well with all other herbs; it offends no taste buds; and the plant, a completely hardy perennial, grows willingly in any good ground, in sun or shade. True, lemon balm is a mover, but much less so than mints; three clumps have been in place in our dryish garden for seven years with no tampering or attention. Its spread—faster in rich, moist earth—is easily checked with a sharp trowel; and if the maturing seed stalks are cut back, no seedlings will spring up. Two plants will meet most needs, but beekeepers might want more.

Melissa is Greek for bee; *Melissa officinalis*, "medicinal bee," is the botanical tag for lemon balm. Balm and honeybees belong together. Not only do the worker bees seek balm nectar, but leaves rubbed all over a hive seem to calm a colony that has just endured the trauma of a trip through the mail. In preparation for working with our bees, my partner, John Scanlan, rubs his hands with balm and brushes his clothing with the branches—better safe than sorry. This little ritual slows him down and, one hopes, makes the bees take more kindly to the intrusion. I read that the Greeks once stuffed their skeps—those picturesque beehives made of coiled straw—with branches of balm in hopes of attracting a passing swarm.

Balm is just as appealing to humans. In all herbal literature, the plant is described as soothing and useful for "nervous problems, hysteria, melancholy and insomnia." Equal parts of lemon balm, chamomile and catnip make an effective nightcap tea; balm, mint and anise-hyssop create a delicious breakfast brew.

Fresh balm leaves also add a mild citrus tang to green salads or other light summer dishes. My preference is fresh balm for tea as well; the flavor, subtle even when fresh, barely survives drying (although we dry a few branches for a winter blend). In any case, fresh frost-hardy balm can be harvested during at least half the year here, longer on the "balmy" West Coast.

Others

Herbs which I like to add to a blend in lesser quantities or brew alone as a medicinal tea, include:

Rue (*Ruta graveolens*): Use the fresh leaves, a tiny smidgen only because of the bitterness and because rue, although beneficial if properly used, is powerful; large doses are capable of producing mental confusion and can even be toxic. Rue is an abortifacient and so should not be consumed at all by pregnant women. Also, handling the plant can cause allergic reactions in susceptible people.

Hyssop (*Hyssopus officinalis*): Bitter but decorative, hyssop, whose tea is also not recommended for continual use, is an old country remedy for rheumatism. A leaf gives body to a blend of sweet herbs.

Sage (*Salvia officinalis*): Fresh or dried, a little adds depth and highly praised health benefits to blends of milder-tasting herbs.

Mullein (*Verbascum* spp): Flowers, fresh or dried from wild or garden mulleins, add flavor and body to mixtures.

Catnip (*Nepeta cataria*): This produces a very soothing tea; sleep-inducing if strong, made from fresh or dried leaves alone or blended with chamomile, balm or mints. It tastes pleasant if sweetened with honey.

Chamomile tea is made by steeping dried leaves and flowers. Don't oversteep or the tea will turn from pleasant and fruity to bitter.

Lemon Thyme (*Thymus* x *citriodorus*): The fresh leaves have the scent and flavor of citrus and spice. Use other thymes for tea, as you like.

Sweet Cicely (*Myrrhis odorata*): This is an excellent tea herb, whose Latin name means "fragrant perfume." The leaves or crushed green seeds add sweetness and a taste of anise to a blend; used alone, sweet cicely tea is said to act as a "gentle stimulant for debilitated stomachs." The sweet seeds of anise or fennel, both of which taste of licorice, may also go into the teapot.

A few flowers can be added to the tea blends. Lavender (*Lavandula vera*) flowers perfume a mixture and, according to John Gerard's 16th-century herbal, are of "especially good use for all griefes of the head and brain and comforteth the stomach." Petals of the old-fashioned fragrant roses and the ray, or outside florets, or bright orange and yellow calendula (*Calendula officinalis*) are good for tea. Use flower florets fresh or dried.

The leaves and flowers of yarrow (*Achillea millefolium*), fresh or dried, were commonly brewed by North American native people

into a general health-building and digestion-aiding tonic. A good addition to a blend, yarrow also makes a pleasantly bitter and aromatic brew on its own, although large doses can produce headaches and vertigo. A mineral-rich tea made from the dried leaves of alfalfa (*Medicago sativa*) has been described as "helpful for every condition of the body, whether maintaining or regaining a healthy state." Blend bland alfalfa leaves with more aromatic mint, lemon balm, anise-hyssop and the like.

Wild Ingredients

The best source of rose hips may be a tangle of wild plants growing in a field or an empty lot beyond one's garden. Many of the native species have good-sized fruits, and the hips of all roses are edible, although not all are large or numerous enough to be worth seeking. Farther afield, meadows and woodlands provide other forage for herb tea aficionados. A tea made from wild strawberry leaves is a reputed "blood cleanser," while raspberry leaves brew a delicately flavored beverage with mild medicinal effects. Both of these are best blended with more aromatic herbs from the garden. A tea of red clover (*Trifolium pratense*), the ubiquitous pasture plant, is said to be very soothing to the nerves; gargled, a strong infusion helps soothe a sore, inflamed throat.

Also blended for beverages is St. John's wort (*Hypericum perforatum*), a common roadside and meadow flower recognizable by its clusters of small but showy sunburst yellow flowers in late summer. The flowers and leafy tops of *Hypericum* species were once found in almost every Old World country household, where they were used medicinally, both externally and internally, to improve sleep, blood circulation and the working of the gastrointestinal system. Now, the plant is usually blended with other herbs simply for use as a beverage.

While it is a good mixer in a blend, yarrow also makes a pleasantly bitter and aromatic brew on its own. Mineral-rich alfalfa, on the other hand, is best blended with more fragrant mint, lemon balm, anise-hyssop and the like.

Tender Tea Herbs

"What does this smell like?" I asked a five-year-old visitor, tucking a crumpled leaf under his nose.

"Suckers," he said without hesitation and, after another sniff, "yellow suckers."

Of all the herbal lemons—lemon balm, thyme, basil, scented geraniums and verbena—the latter (*Lippia citriodora* now *Aloysia triphylla)* is the sweetest and the closest to the real thing. The trouble is that lemon verbena, a small shrub native to Chile and Peru, demands heat and full sun to flourish and shrivels at the first breath of frost. Two sweet-smelling tropical sages—the names pineapple sage (*Salvia elegans*) and fruit sage (*S. dorisiana*) say it all—also thrive in heat and sunlight but struggle and become spindly in low light and chilly places. It is best not to grow the tender herbs if conditions are wrong, but one is tempted for the sake of their ambrosial scents.

The tender tropicals are best grown in large (10 to 12-inch diameter) clay pots that can be shifted outdoors into the sun when summer has settled and brought in again before the first fall frost. The soil mix must be porous but nourishing and moisture-retentive without staying soggy. I like roughly equal parts of good garden loam (but not clay), sifted compost or bagged manure and perlite—several double handfuls of peat moss and a handful of bone meal are a help. Set small nursery plants directly into the large pots to get them going and to avoid time-consuming potting up later.

There are two options for wintering lemon verbena and the tender sages. Either keep them in active but slowed growth all winter by placing them in the sunniest place indoors—a south-facing bay window, sunroom, greenhouse or equivalent—or, lacking such a spot, store the tender herbs after their late fall pruning as one does geraniums, in a cool low-light place (by a basement window or in a protected shed), keeping the soil nearly, but not totally, dry. The herbs will be semi-dormant and need not be disturbed until about a month before the last spring frost, when they are brought again into warmth and light to gear up for summer. In either case, one never feeds a plant that is not actively growing. Potted herbs respond to a drink of half-strength fish emulsion, or the equivalent, two or three times from May through August only.

Pruning twice a year is necessary: once to reduce spindly winter growth by half or more before plants are set out for the summer—less if the herb has been pinched back during the winter; again, but more moderately, in early November as daylight wanes (this is a good time, too, to dry the late summer's growth of leaves).

Sooner or later tender potted herbs, which are shrubs in their native lands, will outgrow the confines of a container. This is the time to start new, small plants from cuttings. Sometimes I do this in spring but more often during August, when sturdy (as opposed to winter-spindly) new shoots are available.

Brewing

Summer is the time for cold teas made from the fruity tropicals, fragrant drinks so much more refreshing than syrupy soft drinks. Nothing could be easier; it is not even necessary to brew the herbs first. Pick a handful of each of lemon verbena, pineapple and/or fruit sage, a sheaf of spearmint, some leaves of lemon balm or anise-hyssop, perhaps a sprig of lemon or cinnamon basil. Put the works into a pitcher with a cup or two of water, then crush and macerate the leaves with the back of a wooden spoon or the end of a wire whisk. Add the juice of a lemon, fill the pitcher with water (sparkling water is a good variation), sweeten to taste—if using honey, dissolve it first in a little of the tea before adding to the pitcher—then let it stand out of the refrigerator for at least half an hour. Strain into glasses over ice, and garnish with borage flowers or a few leaves of the herb. This recipe can be varied by crushing some strawberries or raspberries with the herbs or by using pineapple or orange juice (omit the lemon juice) in place of water. Keep in mind that the less elaborate the mixture, the more evident the herbal tastes will be.

A word about brewing the hot herb teas: "doesn't taste like anything" or "too strong" are frequent reactions. The good-tasting middle ground between insipid and medicinal can be found only by trial and error and, in fact, varies from herb to herb and taste to taste. Be guided by the scent and flavor of the herbs themselves in determining the amounts to brew and the duration of steeping: mild leaves of lemon balm, spearmint and anise-hyssop, for example, are used alone or blended in larger quantities as the predominant flavors, while stronger or more bitter flavors—a leaf or two of sage or a bit of rosemary—will add body and complexity to a blend. Most herb teas are steeped longer than black tea—5 to 10 minutes on average—but taste to be sure. It is possible to almost fill a teapot with fresh herbs and still brew a delicious tea that is not overpowering; just use proportionately fewer dried herbs. One teaspoon per cup is about right.

Each year, a neighbor, Margot Barnard, patiently gathers from her garden and the wild the 20 or so ingredients that make up her own tea blend. "This is the only herb tea my husband will drink," she says. "He doesn't even want his morning coffee anymore." I can attest that the tea is delicious, and given the extraordinary list of ingredients, it must be a potent health-promoting drink.

"It's not difficult to get the herbs together," says Margot, although "they are not all ready at once. I dry little batches of this and that all summer and blend them in the fall."

Margot's Tea Blend

2 parts each of raspberry leaves and red clover flowers, 1 part each of strawberry leaves, St. John's wort flowers, crushed rose hips, common yarrow leaves and

flowers, garden sage, horsetail leaves, black currant leaves, lemon balm, bearberry leaves, twitch grass roots, common plantain leaves, common or lemon thyme and dried apple peel, ½ part of bergamot leaves, ¼ part each of oregano leaves, violet flowers, rose petals, chamomile, mullein and calendula flowers.

Storage

The foregoing herbs alone or in varying combinations fill a teapot from day to day during the growing season. All are easy to dry for winter use: hang bundles of three or four branches (any more and drying is uneven due to bulk) anywhere out of sun where the air circulates freely. Attic rafters or a garden shed will be fine if there is ventilation. I hang bunches from a dowel suspended over the wood stove; the dry rising heat crisps them in short order. When the leaves are crackling-dry, strip them onto a sheet of newspaper, pick out bits of twigs, and funnel the herbs into jars or any containers that can be closed tightly. Store clear glass jars out of light, opaque containers anywhere. Screen drying (as described for chamomile flowers and rose hips) works for leafy herbs if fresh leaves are plucked from stems and laid in a single layer on the screen; if the screen is propped on clay pots that sit directly on the surface of a gently radiating wood stove or over a hot-air vent or register, drying is swift. Oven drying (the oven turned to its lowest setting, the oven door slightly ajar) has its proponents, but I cannot speak from experience.

I wonder if herbal teas—I'll avoid the cumbersome but more accurate term tisane—will ever catch on as a day-to-day drink in the manner of coffee and black or green tea. Probably not, yet because they soothe without sedating and refresh without the nerve-jangling effects of drinks with caffeine, herb teas are gaining popularity. Any restaurant worth its sea salt and demerara sugar now lists, in addition to black tea flavored with everything from strawberries to almonds, alternative teas—at the very least, chamomile, mint and rose hip. Ironically, this narrow range may be the reason that some people turn up their noses at herb teas in general and opt for yet another cappuccino. To my taste, the best herb teas, like the best regular teas, are blends. Unlike "real" teas, however, some of the best herbal drinks are made with fresh ingredients. Teas composed of garden-grown herbs are as varied as the imagination; a little experimental brewing and sipping are sure to result in a special blend or two. ❦

Rue Herb Grace
Ruta graveolens

MEXICAN MARIGOLD MINT

Lucinda Hutson

Tagetes lucida (T. florida)
Compositae

Common Names: Mexican marigold mint, mint marigold, Texas tarragon, sweet marigold, cloud plant; *yerbanís, hierba anís, coronilla, pericón, hierba de las nubes* (Mexico); winter tarragon (England)

Characteristics: glossy lance-shaped leaves, finely serrated; strong anise scent; brilliant golden marigoldlike flowers in fall; perennial

Conditions: loose, well-drained soil; full sun

Size: 1½-2½ feet tall

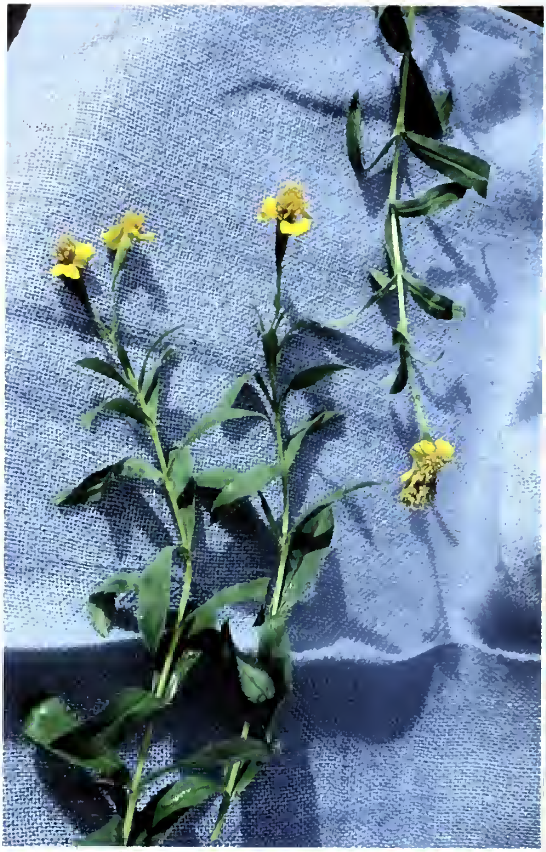
Propagation: reseeds in late fall; roots in water; or plant seeds in flats (germinate in a few days) approximately 6 weeks before planting, and set out in early spring; plant 1 foot or more apart; 1-2 plants per garden suggested

Fertilizer: none required

Pests: some spider mite damage possible during hot months; spittlebugs, which may burrow in emerging leaves during high humidity, should be picked off

Companions: none noted

Lucinda Hutson lives and gardens in Austin, Texas, where she grows more than 200 kinds of herbs. She has taught cooking for 10 years and specializes in food of the Southwest. She is the author of The Herb Garden Cookbook.



Photos by Elvin McDonald

Tagetes lucida, *Mexican marigold mint, has lance-shaped leaves that release a sweet anise scent when bruised. The small yellow flowers look like miniature marigolds.*

Today I can look back with humor on some of the trials and errors I have experienced in herb gardening. Once, while passing a deserted herb plot at our local community gardens, I noticed a plant that I could not identify. Picking off a few of the lance-shaped leaves and bruising them gently released a sharp but pleasant sweet anise scent. I thought I had found French tarragon! (I had never seen it growing and was accustomed to tasting it only in its dried form.) "What a find!" I thought, carefully uprooting a small clump to transplant to my own garden. And so for a few months, I happily grew my "Texas tarragon."

One day, however, a fellow herbalist informed me that my cherished plant was not tarragon, but a somewhat similar herb commonly called Mexican marigold mint. Tarragon (an artemisia) has difficulty tolerating our hot and dry summers; in fact, it requires a cold winter during its dormancy to produce healthy spring growth. Because of this, and because tarragon does not set seed and must be propagated by cuttings, it is difficult to grow in the Southwest.

On the other hand, Mexican marigold mint flourishes in our region and can even be weedlike if not kept in check. And this plant offers an extra bonus: throughout October and November, it prolifically produces marigoldlike flowers to grace the garden. (In cases of drought, it also may try to flower in the summer to preserve the species). You can make a breathtaking bouquet by combining Mexican marigold mint's brilliant golden flowers with scarlet spikes of pineapple sage and violet-colored blossoms of Mexican sage (*Salvia leucantha*). The flowers of marigold mint also make attractive edible garnishes, and the petals may be sprinkled on salads or pasta dishes and used in vinegars and potpourris. I love to adorn the turkey platter at Thanksgiving with them.

The leaves also offer exciting culinary possibilities. Although French chefs would scoff at Mexican marigold mint replacing their beloved tarragon, I find it the best available substitute. *Estragon*, the French word for tarragon, literally means "little dragon," and there is indeed an assertive and fiery taste to tarragon that Mexican marigold mint lacks. And Mexican marigold mint's anise flavor is definitely more pronounced. But use Mexican marigold mint as you would tarragon; in fact, it gives tarragon some competition as a flavoring herb for vinegar. Vinaigrettes made with it enliven mixed spring greens and chicken, tuna or shellfish salads. (Toss about a tablespoon of the chopped fresh herb into the salad as well.)

Sauces, from the classic French *béarnaise* to homemade mayonnaise, take on a new flair when marigold mint replaces tarragon. A tablespoon of the freshly chopped herb added to a melting stick of butter with minced garlic gives steamed artichoke leaves a tasty dunk. It makes a fabulous herbal butter blended with orange zest and minced green onions and tastes delicious tossed with pasta in a creamy tomato sauce. It enhances dips for vegetables, and the sprigs make an attractive garnish.

Grilled Catfish with Smoked Peppers and Mexican Marigold Mint

Celebrated Southwestern chef Stephan Pyles of Routh Street Cafe in Dallas, well known for his magic at the grill, created this special recipe.

½ red bell pepper, seeded and deribbed
½ yellow bell pepper, seeded and deribbed
¼ cup white wine vinegar
1 shallot, finely diced
1 clove garlic, finely diced
8 ounces (1 cup) butter, room temperature
1 tablespoon finely chopped fresh marigold mint leaves
4 6-8 ounce catfish fillets
1 tablespoon oil or clarified butter
Salt to taste

To Prepare Peppers and Smoker

Soak 6-8 chunks of aromatic wood (such as almond, hickory, cherry, apple or orange) in water for 20 minutes. Build fire in smoker with hardwood charcoal briquettes and electric starter. (Avoid chemical starters, as they impart unpleasant flavors to the smoke.) When briquettes are still glowing but somewhat gray (about 20 minutes after starting fire), add soaked wood chunks. Let burn for 5 minutes.

Place peppers on grill over water pan and cover with top of smoker. Smoke peppers for 20-30 minutes. Remove from smoker and roast in preheated 400-degree oven for 10-15 minutes. Peel peppers and chop. Set aside.

To Make Sauce

Place vinegar, wine, shallot and garlic in a medium-size saucepan. Over high heat reduce liquid to 2 tablespoons. Over medium-low heat, begin whisking in butter, a piece at a time, until all butter is incorporated. Remove from heat.

Add chopped peppers and marigold mint. Season with salt and keep warm in pan set over barely simmering water while grilling catfish.

Salt catfish fillets to taste, and grill 3-4 minutes per side, basting with oil or butter. When fillets are done, place each on a plate and cover generously with sauce. Serves 4.

NOTE: Garnish with marigold mint sprigs and/or flowers.

Mexican Marigold Mint Butter

1-2 green onions with tops, or 1 medium shallot, finely chopped
2-3 tablespoons finely chopped Mexican marigold mint leaves (some of the golden petals may be used as well)
½ teaspoon orange zest (optional)
2-3 teaspoons fresh orange juice or *white wine* or *dry vermouth*
1-2 tablespoons chopped pecans or more (optional)
Salt and white pepper to taste
¼-½ teaspoon dried mustard (optional)
¼ pound (1 stick) unsalted butter, softened

This tasty butter complements fish and fowl, grilled or baked, and is especially good with quail. Try it with steamed sweet potatoes or carrots; use it in stuffings and sauces. Garlic may be substituted for green onions.

Texas Tarragon (Mexican Marigold Mint) Vinegar

Fill jar ½ full of fresh Mexican marigold mint. (I generally remove the leaves from the stems so the vinegar won't taste too strong or become dark.) Cover with heated white wine or apple cider vinegar. After straining, I often add small bouquets of marigold mint's colorful golden flowers to each bottle. This vinegar's strong, aniselike aroma greatly enhances vegetables and soups. I like to use it in pickling beets and in making a zesty vinaigrette with Dijon mustard and honey. It makes a wonderful marinade when oil and garlic are added for wild game, chicken and pork. Delicious with seafood salads and in homemade mayonnaise.

Because this herb grows so plentifully in my garden, I have devised innumerable ways to use it. I add a tablespoon of whole, fresh leaves to a quart jar of pickled beets, and a few teaspoons of minced leaves to crunchy carrots sautéed in butter. A simple entrée can be prepared by stuffing minced garlic and marigold mint leaves under the skin of chicken before baking or grilling it.

Others also extol the versatility of this flavorful herb. Mexican marigold mint has recently become the darling of renowned Southwestern chefs such as Stephan Pyles (Routh Street Cafe in Dallas), who partners it with catfish and smoked tomatoes. Anne Greer (author of several Southwestern cuisine books) uses it with pecans to make a unique pesto. Robert Del Grande (Cafe Annie in Houston), uses the flowers in his spectacular salads and various fish dishes. And the Mozzarella Company in Dallas adds it to *caciotta* cheese, giving it a uniquely delicious flavor.

Mexican marigold mint makes a pleasant flavoring for hot and cold beverages alike. As a tea, it is slightly sweet and refreshing. I also add it to fruit punches and sangria. Hot mulled apple cider warmly welcomes guests in the fall, filling the house with its spicy redolence. As marigold mint is at its peak at this time, I add a few large sprigs to the simmering cider and garnish each mug with a sprig of the cheerful golden flowers, evoking enthusiastic comments.

Germans traditionally drink May wine to celebrate winter's passing into spring, serving it from ornate crystal punch bowls adorned with garlands of the season's fresh-

Photo by Elvin McDonald

Tarragon (an artemisia) has difficulty tolerating the hot dry summers of the South and it also needs a cold winter during its dormancy to produce healthy spring growth. Tarragon can be substituted for Mexican mint in any of the recipes.

est flowers and strawberries. May wine is customarily flavored with sweet woodruff, an herb with a woodsy nutmeg flavor that simply cannot abide the heat of the Southwest. Consequently, I have adapted May wine to our part of the country by replacing sweet woodruff with marigold mint and calling it Mexican May wine. This makes a festive drink to serve on the Mexican holiday often celebrated in the Southwest, *Cinco de Mayo*. Remember to decorate the base of the serving bowl with long stems of marigold mint and the garden's finest flowers (float them as well) and fruits.

Fortunately, Mexican marigold mint is now available from several seed catalogs, but unless you plan to grow it for an ornamental border, I recommend buying one or two plants the first year. Believe me, by the following year it will have readily reseeded! Or take a few cuttings from a friend, as they root in water. Plants should be spaced about one-and-one-half feet apart because they will grow a few feet wide and approximately two feet tall with long, spindly branches abundantly covered with finely serrated lanceolate leaves. A well-drained soil and plenty of sunshine are necessary to produce the brilliant golden flowers.

Although I always cook with this herb in its fresh form, I also hang large bunches of it to dry in a well-ventilated room and then store it in jars to use as a tea or as a spicy and fragrant addition to potpourri. Actually, some chefs prefer it in its dried form, as its taste is more mellow. One note of caution: some find marigold mint's flavor overpowering, especially those who dislike the taste of anise; therefore, you may want to use it judiciously at first. Fortunately, I find its perky flavor and versatility an attribute. ❦

Mustard and Marigold Mint Chicken

In this dish, Mexican marigold mint gives tarragon some competition! Served warm or cold, this chicken makes lively picnic fare when sliced into medallions and served on baguette slices spread with honey-mustard. Garnish with fresh sprigs of marigold mint.

4 boneless chicken breasts, split, with ski
Salt and freshly ground pepper to taste
3 green onions, with tops
2-3 cloves garlic, minced
2-3 tablespoons chopped fresh marigold mint
3 tablespoons Dijon mustard
2 teaspoons honey
2 tablespoons butter, softened
1 tablespoon dry vermouth or *white wine*

Slightly flatten breasts and trim excess fat Sprinkle with salt and pepper. Set aside.

Combine the remaining ingredients t make a thick paste. Place approximately 1½ tablespoons of the paste on each breast (skin side down), and roll up tightly from end t end, starting with wider end. Place seam-sid down on a lightly oiled baking dish, and do breasts with any remaining herb mixture Bake in preheated 350-degree oven for abou 30 minutes. Serves 4.

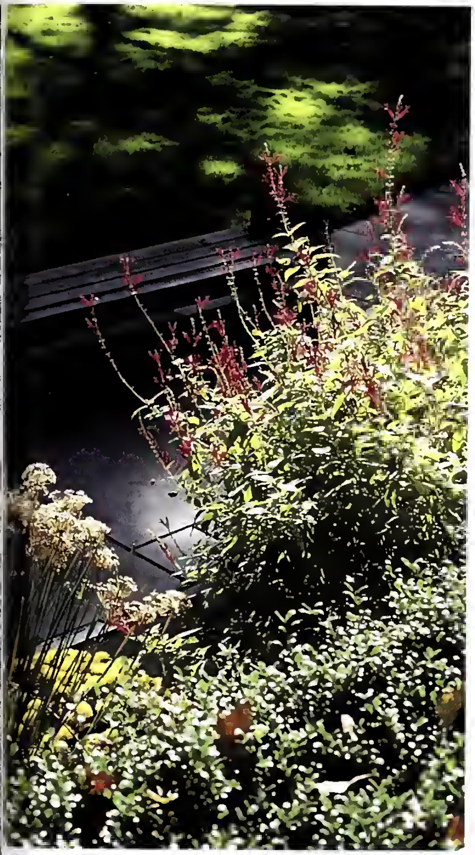
NOTE: Fresh tarragon or dill may b substituted for Mexican marigold mint Sliced into medallions, chicken may b served warm or cold in salads with cris greens. Allow 3-4 slices per salad and dres with marigold mint vinaigrette.

Shared Lessons From Southern Gardens

Linda Askey Weathers

Gardening brings out the best in each of us. Sharing seems to be our trademark, whether it's unloading summer's excess basil or gingerly dividing the sweet woodruff. Information is as precious as the plants, for without it, the little gifts you take home may not survive. So off you go, with a fragile division in hand and your head full of advice.

Growing herbs in the Southeast has always depended on shared experience. Published expertise from northern states or from countries across the Atlantic has not considered the hot days, warm nights, and humid air that are the challenge for both people and plants in the South.



Pineapple sage, Salvia elegans, *adds a decorative element to BBG's Fragrance Garden. It seems to tolerate the harsh summers and mild winters of the South.*

Rosemary will survive the hot summers of Miami Beach, Florida. In fact, it grew to five to six feet in diameter and had to be cut back.

Photos by Elvin McDonald

Linda Askey Weathers grows herbs, perennials and vegetables in her Birmingham, Alabama, garden. She is Associate Garden Editor for Southern Living *magazine and an active member of the Garden Writers of America.*

But even within the Southeast, conditions can vary greatly. The mountainous regions are probably most like the texts, with their own microclimates to be explored. The foothills and Piedmont require an appreciation for shade on the part of people and plants alike. Florida presents the most drastic change of all where seasons are reversed.

No one gardener can know the demands of these areas as well as the people who garden there, so I have talked with three southern gardeners, who have also lived in other areas of the country. This puts them in a unique position to know what is different about growing herbs in the South. And in typical fashion, they have generously shared their experience.

Calera McHenry, Cullman, Alabama

"Full sun in the South is different from full sun in the North. So many times people can grow plants very successfully, in fact better, in partial shade than in full sun. Growing in filtered light is ideal for plants that are tender and wilt readily. Borage looks pretty in partial shade, and it keeps flowering and reseeding. I can grow lovage quite successfully under pine trees. So many plants do very well in partial shade. These can be anything from comfrey to costmary to sweet marjoram. Golden creeping marjoram does much better in shade than sun. The golden color browns off during the heat of summer and looks parched. If you grow it in partial shade, it's much happier.

"Our temperatures with high humidity are not conducive to good growth. For instance, thymes have problems with a mold that is caused by high humidity and makes them look very unattractive. I suggest mulching for lavenders, thymes and other plants that touch the soil. I heartily recommend some type of mulch on top of the ground to conserve moisture and make it look more attractive. If the plant is touching the ground, add a layer of sand around the plant. The sand lets water get on through without staying wet all the time, whereas bark mulch holds the moisture. A half-inch of white builders' sand is ideal."

You might think that milder winters would compensate for the harsh summer conditions. And that is true for many tender perennials. Calera explains, "I don't always manage to bring them through winter, but I want my plants to stand on their own as much as possible. We are all very busy people and we don't have time to protect all these different plants with different requirements. Therefore we need to know which ones may not make it. If they don't, we'll buy another plant. That's how I feel about *Lavandula*, sweet lavender. It grows so quickly. However, my Mexican sage and pineapple sage comes back here, as it did in Georgia. Many people dig it up before it comes back from the root system. If I put a spading fork in there and feel resistance, I leave it alone and let it come back."

Cold temperatures are necessary for some plants. "I've never had any trouble with French tarragon. I've lived in New York, Colorado, Arizona, North Carolina, Texas and New Mexico, and grown it successfully in each state. It has to have a dormant period. It will not go dormant in a warm place and revive to a healthy, growing plant. You'll get a spindly plant. My brother lives in Naples, Florida. He could not get his plant to make it; it was too warm."

For improved winter hardiness, Calera recommends protection from the wind, not cutting back so severely that you induce new growth, and not fertilizing too late in the season. "I like to apply bone meal rather than a high nitrogen fertilizer. *Lavandula angustifolia* and *L. latifolia* are growing during the winter months. Not a great deal, but when the temperatures are 50 degrees F, they are not completely dormant. Therefore they still need some nutrients. I also apply granular limestone. On a plant that is two-feet high, apply a quarter cup of each around the drip line of the plant."

Tip: "I add tarragon and *Tagetes lucida* (sweet-scented marigold) to meat dishes mayonnaise and Bearnaise sauce, and they are great with fruits or as marinades for fruit compotes. Leave them in there until the flavor melds. It's very nice."

Susan Tulloch, Miami Beach, Florida

"Our location in South Florida is really subtropical. There are two seasons. The season when you grow culinary herbs such as thyme and basil starts around October. Then another season starts in April or May. That's when you grow the tropicals like lemon grass and Mexican oregano.

Rosemary
Rosmarinus officinalis

"You are usually better off treating most herbs as annuals, because they fry in the summer. Our seasons are reversed, but we also have a rainy season and a dry season. Summer is the rainy season. We start getting some rain in April and May. Then in summer it rains almost every day. So anything that doesn't like a lot of water will get rained out.

"Rosemary will make it through the summer. I lived in upstate New York for a long time and struggled with it every year. Here in Miami it grew to five to six feet in diameter, and I had to cut it back.

"Thai basil, dill and cilantro will also make it through summer. I never plant those anymore—they just reseed.

"Winter is the dry season when you have to water. We can go three months without a drop of rain—just one beautiful day after another.

"The artemisia genus is difficult. I find that tarragon, southernwood and 'Silver King' don't perform well. You can grow them in winter, but just for a few months before it gets hot. I do grow *Artemisia annua*. I love the smell of it, and it reseeds as well.

"I live on one of the islands between Miami and Miami Beach and our soil is really sandy. Just south of me, Coral Gables and environs are all coral rock. At Fairchild Tropical Garden planting holes were blasted. Now holes are made by picking with an axe. Raised beds can be made and soil added as another solution. Where there is soil, it's very alkaline. It's fine for herbs as far as pH, but it's very nutrient deficient. With the heavy rains and the sunshine, you lose a tremendous amount of nutrients from the soil, so you have to fertilize.

"If you're not using organic sources, the best thing to do is use Osmocote a couple of times during the season. Dig it in when you plant and it will last two to three months. You can apply again in January.

"I make compost and side dress every few weeks. I also apply seaweed and fish emulsion."

Susan also recommends using generous amounts of sphagnum peat moss or other organic matter when you first prepare your soil. By adding compost regularly, she replenishes the soil each year.

Tip: "I make pincushions from dried rosemary leaves. It's so humid down here in the summertime that everything rusts, including your sewing needles. It seems to me that the oils in the rosemary pincushion keep the needles from rusting as quickly as they do normally."

Ruth Wrensch, Tryon, North Carolina

"My training is in botany and chemistry, which I apply to gardening. I compare the native habitat of an herb to where I want to grow it. If you think of many herbs coming from the Mediterranean area and compare that climate to the southeastern United States, you find some notable differences.

"I have photographs of herbs growing in their native habitats. You see a rosemary growing on a hillock in a very arid climate on meager, rocky, calcareous soil. You can grow it in the Southeast if you apply yourself and give the plant what it wants. I would plant it on a hillock where the air can circulate around it and so the fungus infections will be discouraged. I'd provide an alkaline soil, supplemented with oyster shells. On the surface they will reflect back light, preventing the germination of spores.

"There are many herbs that, even though they come from a certain habitat and certain climate, will adapt.

"My garden is divided according to native habitats. We have a garden that is planted as a Mediterranean landscape. Other gardens include herbs from south of the border (Argentina, Chile and Mexico) and native American herbs.

"In this warm climate substitute *Tagetes lucida* for tarragon. Tarragon comes from Siberia where it gets to be 20 below zero F. It does well because it gets that nice cold rest period. Here it is always struggling, and it never develops a good root system.

"*Tagetes lucida* is similar in flavor to tarragon. It has that aniselike, licorice flavor, but it is slightly different. For instance, I don't think it is as lasting as tarragon in vinegar or when dried. If you're making tarragon chicken, use more. However, on salads, as chopped greens, and dressed with vinegar, it is delicious.

"If I compared it to tarragon grown in a colder climate, then I think there would be a greater difference. I originally came from Wisconsin and tarragon was the first thing that came up. By mid-April it's three feet high and you're cutting it down. In two-and-a-half weeks it's back up again. It's not handsome, but it's the aristocrat in the kitchen.

"You can help it along here by encouraging that early growth in the spring. As soon as it's about six or eight inches high, cut it back and preserve that first crop. Give it fertilizer. And then you will get another crop, but never the abundance that you get in the North. It will grow eight to twelve inches high and the patch will increase. Then it will limp along through the heat.

"I live on a thermal belt in the foothills of the Blue Ridge mountains. I can grow any number of subtropical plants here in protected spots. The house protects the garden from north and west winds.

"Even within the Southeast, you have to consider separate areas, depending upon the elevation. Just 18 miles away in Henderson County, they can grow tarragon much better than I can. They grow wonderful angelica, and their lovage will grow six to eight feet tall like it does in the Midwest. But they have more trouble with the freezing out of some plants. This is the Southeast."

Tip: "I like to make little wreaths of swee woodruff that fit over candlesticks to catch the drips. As the candle burns and the hea gets down lower, the oil is emitted from the sweet woodruff, providing fragrance."

Civilized Solutions to the Hurried Meal

Ann Lovejoy

Today's supermarkets offer squid and satsumas, jicama and juniper berries, cilantro and sorrel. *Eight Items Or Less** shows the busy cook how to use these exotic, fresh ingredients—previously available only in specialty outlets—to create fine meals with flair.

Two hundred entrees featuring unusual and seasonal foods help you break out of cooking routines. For each recipe the shopping list stays short and the preparation time minimal. With the convenience of one-stop shopping, hurried mealtimes can become culinary discoveries.

Cooking with *Eight Items Or Less* will speed you from the supermarket express lane to a delicious meal—whether a bite for two or a banquet for ten. Thanks to these streamlined, sophisticated recipes, newly discovered foods such as star fruit, tiny pumpkins, blue corn tortillas and enoki mushrooms will

Large leaves of basil can be stuffed and served as hors d'oeuvres. Here tabouleh salad was used. The ties are garlic chives.

Chopped basil adds a wonderful touch to many dishes, especially those containing tomatoes. The recipe on page 89 for sirloin tip and pan-fried tomatoes contains fresh basil.

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*Eight Items or Less, *by Ann Lovejoy, is published by Sasquatch Books in Seattle, Washington.*

become kitchen staples, to give everyday meals the panache of party food.

Cilantro Pesto Pizza

(Serves up to 4)

This nontraditional pizza has a green sauce hot with chiles and cilantro. The zesty pesto is also wonderful on pork, chicken or turkey; try adding a bit of coriander, cumin and even caraway—many variations are delightful. Pizza crusts, fresh from the bakery or frozen, are available in most supermarkets. Keep a couple in the freezer for quick and different dinners like this one. Use any nuts you prefer—almonds, walnuts, pine nuts—with the possible exception of peanuts. Have a salad of chunky summer vegetables dressed with yogurt and herbs, and drink a glass of Chianti or beer.

1 9-inch pizza crust or *sourdough baguette*
2 tablespoons olive oil
2 bunches fresh cilantro, trimmed and chopped
2 fresh chiles (pasillas, hot wax, or any), seeded and chopped
2 cloves garlic, chopped
¼ cup pine nuts, almonds or walnuts, coarsely chopped
2 ounces grated parmesan cheese
8 ounces mozzarella cheese, sliced or grated

Preheat oven to 425 degrees. Place crust on a baking sheet and brush with oil. Put cilantro in blender or food processor with chiles, garlic, nuts, 2 to 3 tablespoons parmesan and 2 to 3 tablespoons oil, buzz to blend, adding more oil if needed to produce a thick paste. Scrape pesto out of blender (a narrow rubber spatula works very well), pour, and spread evenly over crust. Sprinkle on remaining parmesan. Spread mozzarella over top; the greater amount will please fans of very cheesy pizza. Bake for 15 to 20 minutes until golden brown and bubbly. Cut in pieces with scissors or pizza wheel. Serve at once.

Cured and Smoked Meats

Smoked Turkey Salad in Poppy Seed Dressing

Smoked turkey is frequently found in the supermarket beside the Canadian bacon, the hard sausages, and other specialty meats. For the best flavor, choose a brand that is naturally smoked rather than one slathered with liquid smoke and pumped full of chemicals. Not only will it smell and taste better, the meat will be more tender as well. Here, smoked turkey chunks, pink grapefruit sections and watercress meet in a sage-scented vinaigrette that is crunchy with pine nuts and grainy with poppy seeds. You can always substitute romaine or endive for the watercress, or use mixed greens with some shreds of arugula and green onion. A crusty baguette and a glass of dry chardonnay are all you need on the side.

2 bunches fresh watercress, chopped
8 ounces smoked turkey, cut into chunks
1 small pink grapefruit, peeled and sectioned
2 tablespoons vinaigrette
1 teaspoon minced fresh sage or *½ teaspoon dried*
2 tablespoons pine nuts, toasted
2 tablespoons poppy seeds

Line a salad bowl with watercress. Gently toss together turkey and grapefruit and mound on watercress. Blend vinaigrette, sage, pine nuts and poppy seeds; pour over salad, toss and serve.

Lamb and Beans

Thick lamb medallions broil, grill or pan-sauté in minutes and need very little help to make them delectable (any of these cooking techniques may be used with the following sauce). Properly cooked lamb, by any method, is fork-tender, pink and generously juicy when sliced. Overcooked lamb is gray, tough, and nasty; no sauce can really help, so keep your eye on the cooking time. Fresh herbs make a big difference here, especially the savory, though it retains flavor fairly well when dried. Summer savory is the classic companion for fresh beans, just as winter savory (or dried summer savory) goes into the winter bean pot. This entrée invites a simple rice and cilantro pilaf, a cucumber, orange, and onion salad with an herbed vinaigrette, and a glass of chiaretto or a sturdy ale.

2 to 4 lamb medallions (8 to 12 ounces total)
2 teaspoons butter
½ teaspoon black peppercorns, cracked
1 onion, cut into thin half-moon slices
4 ounces snap beans, thinly sliced on the diagonal
3 tomatoes, cut into wedges
1 teaspoon chopped fresh lemon thyme
1 teaspoon chopped fresh savory (reserve a few leaves for garnish)

Rinse lamb, pat dry. Rub lightly with butter, pat on cracked peppercorns. Preheat broiler. In a frying pan, heat remaining butter over medium heat. Add onion, beans, tomatoes and herbs; stir to coat and cook for 5 minutes. Mash tomatoes with a fork, and reduce heat to warm. While vegetables are cooking, broil lamb for 4 to 6 minutes per side. To serve, spoon sauce onto plates, set lamb medallions on top and garnish with a sprig or 2 of savory.

Rabbit

Hunter's Rabbit

Rabbit has a stronger flavor than chicken, though not by much, and farm-raised animals have none of the gamier overtones often found in wild rabbits. You can use nearly any chicken recipe with rabbit, allowing a bit more cooking time, and conversely, any of these rabbit recipes can be made with chicken or game hens. This one uses the herbs of the Mediterranean fields in a combination favored by hunters, who might gather the herbs as they wandered home, rabbit in the bag. Sometimes garlic tips are sold in the markets along with Chinese mustard greens. If you garden at home, you can snip the shoots of the emerging garlic without hurting the plants one bit. Garlic chives or a clove or two of garlic make a very acceptable substitute. Sweet potatoes and parsnips may be parboiled and grilled along with the rabbit, or serve up new potatoes, infant peas and tiny fingerling beans in dill and chive butter. Warm rolls for sopping up the satiny sauce will be welcome, as will a glass of sprightly weissbier or a dry blush wine.

1 rabbit, cut up by butcher
2 tablespoons olive oil
½ lemon, juiced
2 teaspoons chopped fresh sage
½ teaspoon black peppercorns, cracked
1 bulb Florence fennel with leaves, thinly sliced
1 bunch garlic tips, chopped (2 to 3 tablespoons)
2 tablespoons balsamic vinegar

Rinse rabbit, pat dry. In a frying pan, blend oil, lemon juice, sage, peppercorns and 1 tablespoon fennel leaves over medium heat. Warm combination for 3 to 5 minutes, then lightly brush it on rabbit pieces. Grill rabbit for 10 to 12 minutes on a side, turning several times. Add fennel, garlic tips and vinegar to remaining oil mixture and simmer for 5 to 7 minutes over medium heat, until fennel is tender-crisp. Serve each portion of rabbit with several spoonsful of sauce.

Green Eggs and Ham

A foamy green sauce that tastes of spring envelops strips of lean ham and hard-cooked eggs. This pretty mixture of greens, herbs and walnuts is as good with chicken or fish as in salads like this one. Rinse, but don't spin-dry the greens; just shake them gently, for they cook in the steam from water that clings to their leaves. Pass a plate of thin watercress sandwiches, a basket of fruit and a bottle of lemony weissbier, dry Orvieto or hard cider.

1 bunch fresh spinach, rinsed and trimmed
1 bunch fresh sorrel, rinsed and trimmed
4 ounces lean ham, sliced into thin strips

3 hard-boiled eggs, quartered
2 tablespoons olive oil
1 bunch fresh watercress, rinsed and trimmed
1 small bunch fresh chives, rinsed and chopped
¼ cup walnuts, toasted

Arrange a few leaves of spinach and sorrel on each plate; top with ham and eggs. In a small heavy saucepan, heat 1 teaspoon oil over medium heat. Add remaining spinach and sorrel, watercress and chives. Cover pan and cook over medium heat for 5 to 6 minutes, shaking pan several times. Greens should be limp but still bright green. Put greens in blender or food processor with remaining oil and half the walnuts, adding 1 to 2 tablespoons water as needed to make a smoot sauce. Pour over salads, top with remainin walnuts and serve at once.

Photo by Inger Skaarup

Wonderful marinades can be made using herbs—especially for basting on the backyard barbeque. See the recipe for hunter's rabbit on page 87.

Photo by Elvin McDonald

Basil is the basis for the wonderful pesto being sampled here. Other herbs can be the basis of pesto as well. See the recipe for cilantro pesto pizza on page 86.

Seafood

Sorrel Soup with Shrimp and Bacon

In the Northwest and other mild-winte areas, sorrel has two seasons, spring and fal The epicurean French have elevated thi humble meadow weed to the haute cuisin taming the puckering, astringent quality c wild sorrel to a tingling, piquant sourness. I the best strains, young sorrel is mild enoug to eat raw, snipped into spring salads. Her sorrel's tartness is deliciously offset b crumbled bacon and sweet shrimp in a ric soup that is as bright and green as sprin itself. Like spinach, sorrel cooks down a gre deal, so although four bunches seems like lot, it ends up being a modest amount. A salad of young lettuce and mustard greens dressed with a curried vinaigrette, hot rolls, a piece of aged cheese and a glass of stout make this a delightful meal to enjoy indoors or out.

1 tablespoon butter
4 bunches (4 cups) sorrel, rinsed and trimmed
3 cups milk
2 strips bacon
6 ounces shrimp, cooked
2 tablespoons sour cream
1 green onion, sliced into thin circles

In a heavy saucepan, melt half the butter over low heat. Add damp sorrel; cover and cook slowly until tender and limp, about 12 to 15 minutes. While sorrel is cooking, scald milk. In a frying pan, cook bacon over medium heat; drain off grease. When sorrel is done, add 1 cup scalded milk to saucepan (it will curdle), stirring well. Put in a blender or food processor and buzz until smooth. Return to saucepan, add remaining milk, butter, shrimp and sour cream; heat until butter melts. Ladle into bowls, garnish with green onions and crumbled bacon. Serve at once.

Beef and Lamb

Sirloin Tip with Pan-fried Tomatoes

Red meat has been unfashionable for some ime, but that never stopped people from buying it. It did, however, prompt meat lepartment managers to stock leaner cuts in maller portions, and both of these moves have been well received. A good steak needs ery little help, but it must be acknowledged that leaner cuts, though nutritionally ounder, are less flavorful than well-marbled nes, for the fat carries much of the flavor. limmed-down cuts call for more exciting reatments—rich, spicy or savory ones that mphasize rather than mask the flavor of the eat. Add a spinach, snow pea and walnut alad, toss it with a mustardy vinaigrette and ass around a bottle of Chianti Classico.

12 ounces thick-cut sirloin tip steak
½ teaspoon freshly ground black pepper
1 tablespoon butter
2 tomatoes, halved
1 tablespoon minced fresh basil
1 tablespoon minced fresh chives
¼ cup crème fraiche or *sour cream*

Start coals or preheat broiler. Rinse steak, pat dry. Pat pepper onto both sides of steak. In a heavy frying pan, melt butter over medium heat until foamy. Add tomatoes, cut-side down, and herbs. Prick tomatoes several times with a knife tip. Cook tomatoes slowly for 10 minutes, turn and cook for another 10 minutes. Start cooking steak, allowing 6 to 8 minutes per side. When steak is turned to second side, swirl crème fraîche into sauce, but do not break up tomatoes. To serve, cut steak in 2 portions, set each on a plate with 2 tomato halves, and pour sauce around each serving. Garnish with a few herb leaves. ❖

Nice large leaves of basil have been washed and are ready for stuffing. With a bit of imagination, a host of innovative stuffings can be prepared.

Photo by Elvin McDonald

To really showcase the flavor of herbs try. . .

DESSERT FROM THE HERB GARDEN

Ron Zimmerman

It is now four years since we pounded the last nail, plastered the walls, daubed and dry brushed on the three colors of paint, hung the great old mirror, reupholstered the chairs, set out glazed mustard crocks of herbs and flowers and welcomed the first small group of diners to our little restaurant on our farm in Fall City, Washington.

The dining room at The Herbfarm was to have been an experiment, a sideline, an interlude on the way to other now-forgotten things. We would combine the local foods of the Northwest with fresh herbs from our farm's gardens, serve it all up in a progression of six courses, dust off our hands, say "Thank you" and. . .

Four years have passed. I watch as a bejeweled herbal punch is poured, flashing in the sunlight. Outside a jaunty rooster crows, turtle doves are cooing from their rustic cote, and we are enveloped by the perfume of our 16 herb gardens as we chop, dice, stir, baste and taste, taste, taste—for it is but moments before we greet today's diners and begin to dish up yet another herbal adventure.

In these four years, herbs have drawn us deep into their magic, and their magic brings to us an unending stream of pilgrims eager to delight in the ever-changing litany of flavors

Who would have guessed when we bega that herbally flavored desserts would becom a mainstay and highlight of these meals? Sur ly, we knew, herbs belonged to fish, fow meat and vegetables. But dessert?

Yet as we've sought to introduce people t herbs, we've found that few foods offer a much opportunity to showcase a single he bal flavor as do ice creams and sorbets. Ad ditionally, fresh herbs complement an enhance seasonal fruits and berries. They a also delightful in baked goods of all sorts

When using herbs to create desserts at ou restaurant, we find it useful to think of the by natural flavor groups. So try some of th following Herbfarm dessert recipes. Whe you're comfortable with these recipe substitute herbs from the categories below mix and match while you make your ow herbal discoveries.

Basic Herbal Flavors

Pungent and savory: Rosemary, thyme oregano, marjoram, savory, sage and so basils.

Minty: Mints, balms, some basils, monard perilla, costmary, hyssop, wintergreen.

Lemon: Lemon balm, lemon thyme, lem verbena, lemon basil, lemon grass, so scented geraniums.

Floral: Roses, lavender, violets, jasmi honeysuckle, saffron, some scent geraniums.

Ron Zimmerman is president of The Herbfarm in Fall City, Washington. The Herbfarm offers hundreds of different herb plants, display gardens, herb classes, gifts and mail-order shopping. Mr. Zimmerman is also the chef at the farm's acclaimed restaurant.

Fruity: Fruit-scented sage, pineapple sage, sweet woodruff, bergamot flowers.
Spicy: Pinks, ginger
Menthol: California bay laurel, horehound, some thymes.
Anise: Anise, tarragon, chervil, fennel, anise-hyssop, Mexican tarragon, sweet cicely, licorice, 'Irish Lace' marigold leaves.

Seasonal Melon Balls with Honey and Fresh Sage

Serves 8

This preparation is simple and absolutely delicious. Use whatever melons are ripe as well as your choice of sage: English, tricolor, purple and pineapple all work well.

2 pounds of assorted melons: watermelon, cantalonpe, honeydew and/or musk-melon
4 tbls. honey
2½ tbls. fresh sage leaves, chopped fine to medium-fine
Optional: pinch of salt

Prepare melon:
With a teaspoon or melon baller, ball melon and remove seeds as necessary.

Finish, chill and serve:
Stir in honey and work well to coat the melon pieces. Add sage leaves and optional pinch of salt. Toss well.

Chill thoroughly. Serve garnished with a sage leaf.

Helpful hints
- *If the melon is not absolutely ripe and luscious, add a teaspoon of balsamic vinegar.*
- *For a change of pace, add a teaspoon of crushed peppercorn to the above recipe.*

Sorbet of Rose Geranium and Sweet Cicely

Serves 4 to 6

The rose geranium is a distant cousin of the common geranium. It was first brought to Europe by sailors who found it in southern Africa in 1634. The richly perfumed leaves are the stuff of our magic here, imbuing the ice with a lovely rose scent. Sweet cicely by contrast comes from northern Europe. It is also known as anise or giant chervil and reaches heights of three to four feet. Here the sweet cicely lends the sorbet just a hint of anise and reduces the amount of sugar needed.

1¾ cups water
13 tbls. sugar
12 rose geranium leaves
12 6" sweet cicely sprigs
4 tbls. lemon juice

Prepare the sugar syrup:
Combine about ¾ of the sugar with all of the water. Bring the mixture to a boil and allow to cool to room temperature.

Process the herb leaves:
Put the remaining sugar in a food processor. Add the rose geranium leaves and sweet cicely sprigs and process with the steel blade for 3 or 4 minutes.

Steep the herbal sugar:
Add the herbal purée to the cooled sugar syrup. Stir and let mixture stand for at least 1 hour.

Strain through a very fine sieve or several layers of cheesecloth. Add lemon juice to taste.

Freeze:
Freeze in an ice cream machine according to manufacturer's directions. Or pour mixture into a metal bowl and place in the freezer. Scrape down sides every hour or so until frozen (allow at least 3 to 4 hours).

Serve:
Serve in chilled glasses garnished with an edible rose geranium blossom.

Crabapple & Tarragon Sorbet

Makes 8 servings

At The Herbfarm, we have a particularly fine crabapple tree which showers us with scarlet-blushed yellow fruit that reaches its sweet-

Photo by Inger Skaarup

Many unusual and flavorful ice creams can be made using fruits and herbs. The one pictured is made from plum and garnished with mint. Lavender ice cream is featured in a recipe on this page.

tart peak in the last week of July or first week of August. When combined with fresh tarragon from the herb garden, it makes a wonderfully colored and tasty sorbet.

½ pound crabapples
5-6 tbls. sugar
1 6" sprig fresh tarragon
1-2 tsp. lemon juice
water to cover crabapples

Prepare apples:
Slice the crabapples in half lengthwise. Place in a pot and cover generously with water. Bring to a boil, reduce heat and simmer until apples are very tender. Purée apples with cooking water in a food processor fitted with the metal blade. Strain through a fine sieve.

Finish sorbet base:
Add the sugar. Taste and add more if apples are particularly sour. Place liquid in a pot, bring once again to a boil, reduce heat, add the tarragon sprig and simmer 2 to 3 minutes. Strain out tarragon. Cool and add lemon juice.

Freeze and serve:
Freeze in an ice cream machine according to the manufacturer's directions. Alternately, freeze in a metal bowl set in the freezer. Scrape down the sides from time to time (every hour or two). Break up and stir the frozen mixture well. Sorbet will be ready to serve in 3 or 4 hours.

Lavender Ice Cream

Serves 8—makes 1 quart

The smell of lavender is enough to conjure memories of other times. Here we take both the leaves and flowers of English lavender and infuse it to produce an ice cream subtly flavored and tinted with the herb of love.

2 tbls. fresh or dried lavender flowers
½ cup water
1⅓ cup half & half
2⅔ cup heavy cream
14 tbls. sugar
6 egg yolks
12 lavender leaves (top 4-inch leaf tips)

Prepare lavender flowers:
Place lavender flowers and water in a small pot. Cover with a metal bowl. Fill metal bowl with cold water and ice cubes.

Turn heat to medium. Cook gently for 10 to 15 minutes. Turn off heat. Let set ½ hour. Carefully bounce the metal bowl against the pot to shake off water on the underside. Strain flowers from water—and reserve *both*

Infuse ice cream custard base:
In a medium pot, mix half & half, cream an sugar. Carefully bring mixture to a bare boi (you should have only small bubbles formin around the edge of the pot). Add lavende leaves as well as the flowers. Let steep for 2 minutes; then add the lavender wate Remove from heat. Strain to remove leave and blossoms, pressing hard to extract all th flavor and color.

Thicken the custard base:
In another pot, break up the egg yolks wit a fork. Slowly add the warm lavender crea a little at a time, stirring constantly. Retur

the mixture to the stove and thicken over medium heat until the mixture will coat the back of a spoon.

Strain the mixture through a fine strainer. Set over a cold water bath to chill down custard. Refrigerate at least one hour before freezing.

Freeze & serve:

Freeze in an ice cream machine according to the manufacturer's directions.

Serve in chilled glasses and garnish with a few lavender flowers.

Helpful hints

- *Be sure your custard base is thoroughly chilled before you freeze it in an electric ice cream machine. If it isn't, your ice cream may turn out slightly gritty. This is caused by very tiny particles of butter forming during a too-slow freezing period.*
- *If you don't have an ice cream machine, you can still make a delicious dessert. Put the custard base in a metal bowl in the freezer. Scrape down the sides every hour or so as the mixture freezes.*

'Lady Plymouth' is a rose-scented geranium that can be used in the sorbet featured on page 91. The leaves have a lovely rose scent and add magic to the recipe.

Pictured here are an old rose and the narrow, gray-green leaves of Lavandula. *Use the leaves and flowers of lavender in the custard base of ice cream.*

Rosemary-Thyme Shortbread Cookies

Makes 2-3 doz. small cookies

These cookies are ideal with herbal ice creams. Since they are a true shortbread cookie, bake them only until they are barely colored—there is little moisture in them.

1½ cups flour
¼ cup powdered sugar
9 tbls. unsalted butter
2 tbls. fresh rosemary, chopped fine
2 tsp. fresh thyme, chopped fine
1 tbl. granulated sugar to sprinkle on top

Make dough:

Work together the sugar and butter. Add the flour, rosemary and thyme. Knead together to make a soft dough.

Carefully roll out the dough to about ⅜" thick. Cut into squares, rounds or other small shapes—leaves are nice.

Bake:

Bake on a greased cookie sheet in a moderate 350-degree oven for 15 to 20 minutes—or until the cookies are a light golden color. Do not overcook.

Sprinkle cookies with the granulated sugar. Cool and store in an airtight container.

Seek And Ye Shall Find

Barbara J. Barton

Herbs! I'm not into herbs! My first reaction when asked to write a few words about herbs is terror, and yet a stroll along my gopher-ravaged perennial border reveals that I do, in fact, grow many herbs with great pleasure: yarrow, bee balm, wormwood, Russian sage, lamb's ears, violets, foxgloves, lavender, rosemary, lavender cotton, sage, mint, feverfew, woolly thyme and more borage than I ever dreamed of when I first put in one or two plants for the pretty blue flowers. Not yet caught up in the rage for herb crafts and lore, I already love a number of plants classified as herbs because they grow beautifully and without fuss, seem to take less water and look wonderful over a long period. Furthermore, most of these plants have been ignored by the gophers who cheerfully pull down my other treasures; perhaps the gophers don't relish the stronger fragrance or flavor of the herbs (deer definitely tend to avoid plants with pungent tastes and odors).

My next reaction is to find out more about the plants themselves, their garden interest and how to grow them. My garden is "cottage inspired" if the meaning of that is an air of benign neglect or a too casual devotion to plants of every kind; there are no cunning brick paths or gaily painted plant labels, but there are many treasures carried home from plant club meetings, presented by friends or grown from seed ordered from afar. Having mind-gardened from catalogs and books for years before I had garden space to try out my ideas, I want to know *everything* about a plant before deciding whether to fall in love and invite it home. Being the possessor of a huge collection of nursery and seed catalogs, I turn not to the plethora of lovely illustrated books on herbs but to my herb catalogs to find the sort of information that I most want to know.

Personally, I feel a catalog should combine entertainment, education and seduction. My favorite catalogs educate first, but also entertain with the writer's personal experience with and honest opinions of the plants, and seduce not just with pretty pictures but also with the lure of trying something new and special. Here's where the writer has to pass the "must-have test": if reading the catalog makes me reach for a pen and start marking plants before sober good sense intervenes, it's a really good catalog. I like catalogs which are like personal letters from the seller to the buyer, straight talk from a more experienced friend; I'm also a firm believer in full disclosure, and want to learn the quirks and faults of the plants as well as to hear their praises.

As I changed from a catalog junkie into a professional catalog maven I found other musts. Good plant descriptions with size, plant habit, season and color of bloom are

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essential. Also important is the inclusion of proper botanical and cultivar names—it's usual to list herbs by their common names, but each herb seems to have so many common names, both current and historical, that the only way to know *exactly* which plant is being talked about is the use of its correct Latin binomial and cultivar name. To be fair to the merchants, a catalog is really an offer to *sell*: a serious company will tell you all about how they conduct business, and give you the name of a real human being to contact in case of problems. Are all these musts satisfied? Now you can start to compare plant size, shipping distance, season and method, and finally, price. When you find a good source of robust plants, stick with them and tell all your friends about them—they deserve all the business they can get.

One of my favorites is the herb catalog of Companion Plants of Athens, OH; descriptions of both the plants and their uses are extensive and interesting. If I had read up on borage, I'd have found that "The whole plant is covered with fine hairs. . . the flowers and young leaves are delicious in drinks and salads. . . has a cucumber flavor. . . a good source of vitamins and minerals, particularly potassium and calcium. . . and *reseeds nicely*." The nice reseeding in Ohio is frankly just plain wanton in California! Another favorite is from Nichols Garden Nursery in Albany, OR; they are a little less expansive in descriptions and sell more than just herbs, but they also tell me something of what herbs are used for and all I need to know about how to grow them. They tell me that the first person to set the volatile oil of the gas plant alight was Linnaeus' daughter—how do you suppose it ever occurred to her to try it? Almost the best seed catalog ever published is that of J.L. Hudson, Seedsman of Redwood City, CA: it is literally an education on the whole plant kingdom, including herbs from every continent. He tells us that *Genista tinctoria* in addition to being called broom is also 'woadwaxen' or 'dyer's greenweed', making both an excellent yellow and green dye; the buds were used as substitutes for capers, and its medicinal uses go back to Pliny.

The catalog of Wrenwood of Berkeley Springs in West Virginia has good cultural information on the ornamental uses of herbs as garden plants, full of growing advice and herb lore, as does the catalog from Dabney Herbs in Louisville, KY, Sunnybrook Farms in Chesterland, OH, Taylor's Herb Gardens in Vista, CA and Richter's in Goodwood, ON, Canada, are from long-established companies; their information is concise and professionally presented. On the other hand, the catalog from Bee Rock Herb Farm in Flintstone, GA is only a few photocopied pages, with very brief descriptions, but offering a number of unusual plants. The catalog of the Sandy Mush Herb Nursery in Leicester, NC is both interesting and written in an italic hand so beautiful that reading it is a dreamy trip back in time.

I have mentioned only a very few, but there are many excellent herb nursery catalogs—some with selections so huge that there is only room to list the varieties and give just the briefest plant descriptions. Other catalogs overflow with tussie-mussies, wreaths, teas, herbal pillows and the makings of potpourri, sachets and various herb crafts, listing only a few plants and seeds; the uses and lore of medicinal and culinary herbs fill others; many more deserve mention than there is room for here. When you dash home to your favorite chair, kick off your shoes and toss aside real letters for the new catalogs, you'll have to admit that catalog study is an addiction for which there is no cure. Curl up with a few good ones tonight; it could be the start of your real horticultural education!

To find catalogs from herb nurseries, check the ads in herb and general gardening magazines. Other sources are *The Herb Gardener's Resource Guide* by Paula Oliver; the second edition lists over 500 sources of herbal goods of all kinds (write to Northwind Farm, Rt. 2,

A collection of catalogs is entertaining, educational and seductive. Good plant descriptions with size, plant habit, season and color of bloom are essential.

Box 246-PG, Shevlin, MN 56676), and my *Gardening by Mail 3: a Source Book,* published by Houghton Mifflin, which lists over 1,000 nurseries and seed companies, including many specializing in herbs.

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BARBARA B. PESCH, *Editor*

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